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Pollution Prevention Guidance and Tools for POTWs

A Collaborative Product of Bay Area Clean Water Agencies,
Bay Area Pollution Prevention Group, and San Francisco
Regional Water Quality Control Board

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Glossary of Acronyms and Terms

Acronyms

AMSA:	Association of Metropolitan Sewerage Agencies
BACWA:	Bay Area Clean Water Agencies
BAPPG:	Bay Area Pollution Prevention Group
Cu:	Copper
FOG:	Fats, Oils & Grease
gpd:	Gallons per day
Hg:	Mercury
mgd:	Million gallons per day
NPDES:	National Pollutant Discharge Elimination System
P2:	Pollution Prevention
POTW:	Publicly Owned Treatment Works
ug/L:	Micrograms per liter, or parts per billion

Terms

Pollutant:	The chemical or compound that adversely impacts water quality.
Source:	The physical location or item that produces or expels the pollutant.
Pollution Prevention:	Any action that causes a net reduction in the use or generation of a toxic pollutant that is discharged into water. Does not include actions that merely shift a pollutant in wastewater from one environmental medium to another environmental medium, unless clear environmental benefits of such an approach are identified.
Effectiveness:	A measure of the overall success of a program. If the program is effective, it is successful at reducing pollutant levels in a reasonable way.
Cost-Effectiveness:	A measure of the financial success of a program. If the program is cost-effective, it is successful at reducing pollutant levels without unreasonable expenditure of funds. The amount of pollutant reduction can determine the cost-effectiveness.
Mass Balance Closure:	Closure indicates that the sum of the estimated or measured loads from various sources is equal to the total known influent load. Lack of closure indicates that the sum of the loads from various sources is greater than or less than the total known influent load.
Ubiquitous:	Everywhere, ever-present, found in everything.

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1. INTRODUCTION

As pollution prevention (P2) plays an increasing role in source control programs, wastewater agency/POTW program managers are continually faced with the need to create new program elements to address an array of pollutant issues. This document was developed as a guidance document to assist P2 program managers and their staffs as they develop new programs and enhance existing programs. It is intended to provide guidance at the various stages of a wastewater agency's/POTW's P2 program both with respect to addressing pollutant issues commonly encountered by wastewater agencies and to work with emerging pollutants and pollutants with complex issues. Because each agency has a unique set of characteristics, issues, and resources, the guidance is intended to provide a range of options that will allow managers to develop the most effective programs for their agency and service area.

To guide this effort, a San Francisco Bay Regional Water Quality Control Board (RWQCB or Regional Board) Resolution, developed jointly by the Bay Area Clean Water Agencies (BACWA), the Bay Area Pollution Prevention Group (BAPPG), and the Regional Board, provided that a steering committee be set up not only to develop tools (i.e. menus) but also to establish guiding principles that will shape and focus collaborative Bay Area P2 efforts undertaken over the long-term.

These guiding principles are intended to provide a framework for creating tools and program guidance to assist publicly owned treatment works (POTWs) in the development of excellent, effective programs. The following guiding principles were adopted by the Regional Board in Board Resolution R2-2003-0096 :

- a. Promote activities designed and coordinated on a region-wide or watershed basis to achieve more cost-effective, powerful, and consistent results.
- b. Promote cross-program and cross-media perspectives/approaches where appropriate.
- c. Encourage Bay Area POTWs to continue their roles of P2 leadership, creativity, and excellence and to recognize their successes.
- d. Ensure balance between environmental (e.g., receiving water quality) benefit and cost effectiveness.
- e. Provide flexibility to develop P2 programs that reflect regional and service area differences and current and historic pollution prevention efforts.
- f. Achieve program accountability by defining levels of expectation and assessing program performance. Peer reviews, self-audits, and other formats will be considered as tools for these assessments.
- g. Consider POTW sizes and resources when developing expectations.
- h. Provide flexibility to balance among source identification studies, pollutant-specific and non-pollutant specific P2 to implement the most cost-effective approach for each pollutant.
- i. Provide flexibility to measure impacts of a program over an adequate time period to acknowledge short term benefits that result from immediate actions such as product replacement and long term benefits that result from behavior change of the target audience.

- j. Incorporate adaptive management in a manner that allows POTWs to adjust the frequency, add, modify or sunset program elements as circumstances dictate.
- k. Preserve voluntary aspects of current program components within structure of regulatory requirements.

2. BACKGROUND

Pollution Prevention (P2) is a strategy to keep pollutants from reaching the environment, thereby maintaining or improving the quality of our air and water. Several of the nation's leading industries say "Pollution Prevention pays", viewing it as a sustainable business practice. Increasingly, the nation is coming to understand P2's value—as an environmental strategy, as a sustainable business practice, as a fundamental principle for our society. Likewise, P2 can serve as a useful vehicle to "reinvent" government and its approaches to protect public resources and health. Good pollution prevention programs require a balance between society's priorities, finite resources, and environmental benefit.

The San Francisco Bay area has some of the most proactive Pollution Prevention programs in the nation. For more than a decade, Bay Area POTWs have developed and implemented P2 Programs that have reached far beyond federally mandated programs that focus primarily on large industries. P2 Programs have reached out to almost 27,000 businesses in the Bay Area to reduce or eliminate pollutants, such as copper, nickel, silver, and perchloroethylene, from entering the sanitary sewer and ultimately the San Francisco Bay and its tributaries. Some of these businesses include vehicle repair facilities, plumbers, medical offices, dentists, dry cleaners, machine shops, printers, photo processors, and restaurants. Residents have received information on pollution prevention alternatives such as Integrated Pest Management, less-toxic household cleaners, alternatives to copper-based root killers, and water pollution prevention. Numerous POTWs have excellent school outreach programs to teach the next generation to make environmentally responsible decisions. In addition, through the BAPPG, POTWs have worked together on several successful regional projects. Some of these projects include (1) the administrative ban - by the Department of Pesticide Control - of copper-based root killers and tributyltin cooling tower additives, (2) *Our Water, Our World* Integrated Pest Management Store Partnerships, (3) a presentation entitled *Responsible Environmental Dentistry* that has been presented to Bay Area dental associations, (4) inspection check-list and outreach materials for dental offices, (5) radio commercials containing water pollution prevention messages in Spanish for the Bay Area Latino community, and (6) publication of several nationwide reviews of literature and pollution prevention programs related to commercial and residential sources of wastewater and stormwater pollution prevention.

To maintain the Region's excellent record, and jointly face new challenges, BACWA and the Regional Board launched a new initiative by Board Resolution R2-2003-0096 in October of 2003 to work together to develop P2 guidance and tools for new and/or

existing Bay Area POTWs. The effort will span long and short term goals and will face scientific and policy issues as needed.

The guiding principles, outlined in the resolution and listed above, are intended to guide the collaborative effort between participating agencies. They form the basis for developing the menus of pollution prevention options (found in Appendix A) and the program development guidelines included in this document.

A Pollution Prevention Steering Committee comprising POTW and Regional Board representatives was formed to guide this project and ensure it is consistent with the guiding principles. The first product/goal of the Pollution Prevention Steering committee was to develop menus of pollutant-specific pollution prevention options for implementation at Bay Area POTWs and provide guidelines for using the menus to develop successful programs that meet NPDES permit requirements and take into account agency size, resources, and service area characteristics. The menus contained herein, however, are by no means exhaustive, and serve only as tools to help POTW P2 program coordinators get started, identify resources, and find out what other programs have done to reduce pollutant discharges. To keep the menus useful over the long-term, as more pollution prevention information becomes available, they should be updated to reflect new information. While program needs for some pollutants will be served by menus of options, pollutants with limited influent source information, no obvious influent sources or other complex issues will require the consideration of special factors. Therefore, guidelines for developing programs to address these more complex issues are also provided. In summary, this document provides overall program guidance for the P2 manager, menus as a tool, and guidance on how to apply them.

Program Guidance for developing new or expanding existing successful pollution prevention programs are found below in the following sections.

- Elements of a successful program
- Intended audience
- How to use this document
- Pollutants with complex issues
- Steps to develop a successful program

2. ELEMENTS OF A SUCCESSFUL PROGRAM

In general, a pollution prevention program involves characterizing your service area in order to identify major sources of pollutants in the influent, and then educating the public and businesses in the service area to create an awareness of where pollutants of concern come from and how they can be eliminated or reduced. California Regional Water Quality Control Board Resolution R2-2003-0096 (from section 13263.3 of the California Water Code) defines a pollution prevention program as containing the following elements:

1. Estimates of all the sources of a pollutant contributing to the pollutant's influent loading.

2. Analysis of methods to prevent the discharge of pollutants from the identified sources.
3. Estimate of load reductions that may be achieved through implementation of the methods identified in item 2.
4. A plan for monitoring the results of the pollution prevention program.
5. A description of the tasks, cost, and time required to investigate and implement various methods.
6. A statement of the POTW's short-term and long-term pollution prevention goals and strategies.
7. Description of the POTW's existing pollution prevention programs.
8. Analysis of any adverse environmental impacts resulting from the proposed pollution prevention program.
9. Cost-benefit analysis to implement the pollution prevention program.

A successful pollution prevention program is one that carefully plans ahead. Steps for developing a pollution prevention program with measurable results are described below.

3. INTENDED AUDIENCE

This document was intended to be used by the water pollution professional to aid both new and long-time program managers in their decision making processes regarding P2. For the new program manager, it may be daunting to decide the first steps to take in tackling a pollutant, to decide the best approach to address a given pollutant in a particular region or service area. For the long-time program manager looking to improve an existing program or move in a new direction, this guidance can extend the range of options and perhaps identify different approaches that may be useful. For both types of program managers, the P2 menus will facilitate a survey of actions taken by other programs throughout the Bay area, provide a list of resources for reference, and serve as a program resource leading to other more experienced P2 programs. In addition, regulators and POTWs alike should be able to use this document to assess reasonable expectations for programs based on resources, agency philosophies, and service area characteristics. This document will also provide tools to assess the universe of actions taken throughout the Bay, and how the POTWS judge the success of those actions.

4. HOW TO USE THIS DOCUMENT

Pollution prevention (P2) programs are developed in response to a need to reduce discharges or remove a constituent from the waste stream. Often, programs are developed on a pollutant-specific basis. Therefore, menus have been created that are useful for pollutant-specific P2. Depending on a variety of factors, programs may also be developed targeting a category of pollutants (e.g., pesticides) or targeting general awareness of water pollution. Programs developed for these situations will have some differences from a pollutant-specific program. Finally, for some pollutants, information is limited or there are other complex issues. The course of action in this case may be very different than a pollutant-specific P2 program.

The following tools were developed to assist POTWs in developing effective water pollution prevention programs.

- *General guidelines for P2 program development* – these guidelines are described in a stepwise fashion in the section “Steps to developing successful programs.”
- *Pollutant-specific menus for copper, mercury, FOG (fats, oils, and grease), and pesticides* – These specific menus are found in Appendix A and were chosen to represent the range of typical pollutant issues. In addition, the copper menu may serve as a starting point for working with other metals, and mercury serves as another example of a constituent with clearly identifiable pollutant sources. The FOG menu is an example of working with a constituent that has impacts other than on treatment plant effluent, and the pesticides menu serves as an example of working with a class of related compounds with similar sources and pollution prevention options. When to use the menus will be discussed in the section “Steps to developing successful programs.”
- *Guidelines for working with pollutants with complex issues* – An overview of working with this type of pollutant is provided in the section “Pollutants with complex issues.” Then information on working with these types of pollutants is also included in each of the steps in the section “Steps to developing successful programs.”

To use the document, it is recommended that you first figure out where you are in the process of developing a program and go to that section to obtain guidance and ideas on what to do next. For example, you may know what your program’s issue is (i.e., pollutant of concern) and what the most likely source is. The next step is to determine the most effective pollution prevention options for your situation. Simply go to the step “identifying and prioritizing pollution prevention strategies” in the section “Steps to developing successful programs.” The information provided in this step should provide you with the ideas and basic background that will allow you to choose pollution prevention options.

5. POLLUTANTS WITH COMPLEX ISSUES

Some constituents will have complicating factors, and using the standard steps described below of identifying sources and corresponding pollution prevention options may not be feasible. Certain pollutants are ubiquitous, such as bis(2-ethylhexyl)phthalate or dioxins. Bis(2-ethylhexyl)phthalate appears to be a laboratory contaminant, making it difficult to determine how much is actually in the influent, or where it is coming from. “Dioxin” describes a group of chemicals that are highly persistent in the environment. These chemicals are formed as (unintentional) by-products of many industrial processes involving chlorine such as waste incineration, chemical and pesticide manufacturing and pulp and paper bleaching. The major source of dioxin in the environment comes from waste-burning incinerators of various sorts and also from backyard burn-barrels [Ejnet.org, 2004]. Dioxins enter the water most likely through air deposition. Therefore, wastewater sources of dioxins are difficult to identify.

Another example of a complicated pollutant is dieldrin because it is banned in the United States, but is still used in tropical countries for the control of tse tse flies and

termites [EIP, 1997]. Dieldrin found today is likely due to atmospheric deposition of dieldrin used in other countries as well as the import of foods and materials manufactured in parts of the world that still use this pesticide. In addition, pesticide residues on historically treated soils and materials (i.e., buildings previously treated for termites) may be released today. In some cases, people may possess aldrin and dieldrin that was purchased before the bans in 1974 (banned all uses except termite control) and 1987 (banned use for termite control) [U.S. DOH, 2002]. As dieldrin has already been banned in the United States, there is little pollution prevention that can be performed. However, in situations like this, performing outreach to collect and dispose of aldrin and dieldrin purchased before the bans is a possible pollution prevention measure.

Additionally, some constituents like cyanide are often not present, or present in low concentrations, in the influent. Pollution prevention for these types of constituents in influent would not be a feasible endeavor. Approaches targeting further research or treatment process evaluation would be necessary.

Working with these issues may require innovative approaches or acknowledging the limitations of pollution prevention. In some cases, additional research may be needed, as in the case of evaluating laboratory procedures for bis-2-ethylhexyl phthalates or conducting research to determine how a constituent may be formed (like cyanide) as a result of a treatment process. How these issues manifest themselves at different steps in the process will be discussed as applicable in each of the steps in the next section “Steps to developing successful programs.”

6. STEPS TO DEVELOPING SUCCESSFUL PROGRAMS

As discussed above, planning will be important to developing a program that will accomplish your agency’s pollution prevention goals. Key steps include:

- Identify pollutants of concern
- Identify and assess influent sources of pollutants
- Evaluate controllability of influent sources of pollutants
- Identify and prioritize pollution prevention strategies
- Establish a goal for specific strategies or actions
- Establish effectiveness measures (task-specific and program-specific)
- Implement the program
- Evaluate program effectiveness
- Modify the program

Application of the basic steps to developing a pollutant-specific P2 program are presented in the rest of this document.

Identify Pollutants of Concern

The first step in the planning process is to identify the issue to be resolved. For most wastewater programs, this means identifying pollutants of concern based on several

factors including permit limits that are difficult to meet, the potential for the discharge to cause or contribute to the exceedance of a water quality objective, or some other adverse environmental condition.

It is possible that a group of related pollutants may be identified as a concern (e.g., polynuclear aromatic hydrocarbons(PAHs), pesticides, etc.) or that the identified pollutant is one of a group of related compounds. Identifying these relationships or groups may be useful for future planning. For example, developing a program to address chlorinated pesticides or banned pesticides as a group rather than working with pesticides such as dieldrin, aldrin or DDT individually may be more effective in the long term.

Any complicating issues should also be identified, like those pollutants unlikely to have influent sources, ubiquitous pollutants, or where more information is needed.

Identify and Assess Influent Sources of Pollutants

The next step in the pollution prevention process is to identify the influent sources, their significance, and the potential for controllability.

The first approach would be to refer to the menus in Appendix A if the pollutant is one of the subject pollutants or a related pollutant (i.e., the copper menu may be useful for other metals too).

The P2 menus in Appendix A provide information on sources under the headings, Potential Sources and Existing Resources. The menu headings for evaluating sources are described in more detail below.

Potential Sources

In the menus, influent sources are broken up into relevant categories including:

- Residential
- Environmental
- Commercial
- Industrial
- Stormwater
- Agriculture

For pesticides, information is also provided, where available, when a source pertains solely to one type of pesticide (i.e., diazinon). In the “Potential Source” column, influent sources have an asterisk (*) if they are frequently targeted by other agencies.

The menus can be used to select sources by reviewing the lists of potential sources and comparing them to the types of businesses and activities in your service area. It is possible that certain business types will stand out as having some larger businesses in that category with respect to size or number of employees, or as having an unusually large number of businesses in a particular

category, or perhaps as having been problematic in the past. Another way to use the menus to select potential sources would be to consider those sources as denoted with an asterisk (*) that have been targeted as large sources by other agencies.

Existing Resources

The existing resources heading ranks the amount of information available on each identified source. A ranking of “Low” indicates there is little information available, while a ranking of “High” indicates that other agencies have worked with this source and, therefore, there is a considerable amount of information available for that particular source. Refer to Section 8, Available Resources, to find the information available for a certain source. It is also a good idea to consult with the BAPPG and the other list serves that are identified in Section 8. These list serves are also a good place to ask about sources of pollutants for which information is not readily available.

The menus identify some influent sources and provide information on which sources may be significant. For constituents other than those identified in the P2 menus, it is possible to assess influent sources using some of the techniques described below.

Influent sources in a service area can be identified by:

- Reviewing collection system monitoring data to quantify pollutant loads associated with service area activities,
- Conducting a literature review (or using the attached menus) to identify probable influent sources and wastewater pollutant concentrations associated with these sources,
- Review internet sites or handbooks that describe the uses of a chemical (the ASTDR site is one useful place to look),
- Conducting a business inventory to determine where businesses are located in the service area that may be contributing pollutants to the influent,
- Reviewing water account data to determine relative flows associated with each influent source category,
- Using above information to determine if a quantitative approach to identifying influent sources is necessary.
- Using the above information to estimate load contributions from different influent sources, if necessary.

While source identification efforts may help determine the influent sources with the highest concentrations of pollutants of concern, it may be beneficial to calculate loadings from each source (concentration multiplied by flow), as a high concentration with a low flow may produce a lower pollutant load than a source with a low concentration and high flow.

A simple approach to assessing influent sources is to use information from other agencies. However, if that information is not available or you suspect your community

may have unique characteristics, the best approach involves an analysis of your local area.

Many studies have been performed that attempt to identify sources of pollutants from commercial, residential and industrial activities. In addition, research has been conducted on the effectiveness of pollution prevention programs. This information is available from various reports and Internet sites. Some resources are listed in Section 8 (Available Resources). In most cases, data obtained can be averaged to obtain representative pollutant concentrations and source flow data when local information is not available. In addition to commercial, industrial and residential sources, stormwater inflow and septage waste may also be considered.

Wastewater characteristic data can be used to estimate loadings, where available (**Appendix B**). If no outside information exists, it may be worthwhile to perform trunkline/collection system monitoring for pollutants of concern. By choosing lines to monitor that are solely from residential, industrial, and commercial areas, you can begin to narrow in on potential sources of pollutants. Additionally, data collected from local limits monitoring, or other studies performed in your service area can all be useful for estimating influent sources.

An alternative to developing load estimates and gathering local data is to look at model studies that may be available. For instance, the City of Palo Alto discusses many source identification study efforts on their website (<http://www.city.palo-alto.ca.us/cleanbay/>). Similarly, a study on mercury sources performed by the Association of Metropolitan Sewerage Agencies (AMSA) is available on the internet for other agencies to review (<http://www.amsa-cleanwater.org/pubs/>). Internet searches for pollutants of concern are simple, cheap, and may reveal other reports that can be used to identify sources, and ideas for control efforts.

Evaluate Controllability of Influent Sources of Pollutants.

Once influent sources are identified, evaluating the controllability of the source by the local agency is the next step in pollution prevention assessment. Some pollutant discharges are the result of activities at local businesses or industries. In these cases, the agency has the legal authority to require that businesses make changes to reduce the pollutant discharge. The local agency may also choose to work with businesses on a voluntary basis to make changes. Some pollutant discharges may be generated by residential activities. The local agency has the ability to educate the public and provide incentives to encourage the public to make behavior changes. These pollutant sources are considered to be directly controllable by the local agency.

On the other hand, a pollutant may be entering the environment through air or other media not controllable by a wastewater agency, (i.e. dioxin). Reduction of pollutant discharges in this case would be considered uncontrollable by the agency. While the reduction of discharges in this case may be uncontrollable, the local agency's P2 program may have a goal of increasing awareness, which is controllable.

Sources that are not under direct control of the local agency (i.e commercial products, pollutants conveyed through atmospheric deposition) may require further research or alternative approaches. Means of addressing these include the ban or modification of a commercial product, or partnering with another regulatory agency or business organization that has more direct control over the pollutant source.

The controllability of the source will influence your ability to develop an effective pollution prevention program or, at the very least, the type of P2 program you develop. For example, for a consumer product that is beyond the agency's control to eliminate, a manager's goal may be to create awareness and attempt change purchasing practices in their service area. In some cases, the source may be truly uncontrollable such as natural sources or human waste.. In some cases, there may be public outreach that could be conducted, although this may not accomplish significant discharge reductions, or may only result in measurable reductions over a longer time frame..

The P2 menus in Appendix A do not identify directly whether a source is controllable. However, in the column, Pollution Prevention Strategies, the strategies listed are based on the controllability of that source by a local agency. For directly controllable sources, regulatory options (e.g., permits) will be one of the categories of options listed. Other controllable sources that rely on voluntary strategies will have those types of options listed. In addition, certain sources are identified as uncontrollable- by the local agency working alone. In addition, as noted previously, the sources are grouped into categories. In general, the industrial and commercial sources listed will be more controllable and the residential sources will be less controllable or only controllable through voluntary approaches. Environmental sources may be largely uncontrollable but may lend themselves to approaches based on partnering opportunities with other environmental agencies.

Industrial and commercial activities are the most likely to be controllable because it is likely that the agency staff have existing relationships with many of the businesses and industries in your service area and these businesses will be familiar with environmental regulations. In addition, it is likely that the agency has legal authority over most businesses in its service area. An agency's ability to work successfully with these sources will be enhanced by identifying partnering opportunities either with applicable trade or professional organizations or by identifying other government agencies that may work with the identified businesses. Some information on partnering opportunities is provided in the menus under the column called Partnering Opportunities.

Controllability of residential sources will be possible in many cases but more difficult in that, in most cases, you will have to rely on voluntary actions by the general public, or the benefits may take longer to see. Challenges in this area include; successful education, developing alternatives to use and disposal of a product, and changing behaviors. One extremely effective pollutant control strategy is a product ban. In this case, the controllability will rely on identifying the appropriate partnerships to approach something on a regional or state-wide basis.

For sources that are outside the agency's jurisdiction, it may make sense to explore partnering opportunities. An example of this may be if the water supply is a source. In this case, partnering opportunities with the water purveyor could be explored. For certain sources listed in the P2 Menu, Appendix A, partnering opportunities are identified. Therefore, referring to this column in the menu may provide a starting point for generating ideas for working with sources that are outside your agency's jurisdiction.

Identify and Prioritize Pollution Prevention Strategies

Once the relative contributions of sources and their controllability have been assessed, strategies can be identified for the most significant, controllable sources. Selection of P2 strategies can be based on the experiences of other communities with similar pollutant sources. Which strategies are best will depend on your agency's resources, regulatory requirements, what you have experience with, and what works best for the targeted audience.

Decisions regarding pollution prevention strategies are based on cost effectiveness, effectiveness at reducing influent load, and applicability to the service area. Assessment of cost along with an evaluation of wastewater and environmental P2 benefit should provide information on the overall cost effectiveness for each strategy. There are many different definitions of "effectiveness" and all are important to consider when choosing pollution prevention strategies. Questions to ask regarding strategies are:

- How much will this cost us?
- How much reduction of the pollutant will we see in the influent? In the effluent?
- How many people will this message reach?
- How willing will people be to implement these strategies?
- How will this work for us logistically?

The goals you set for your program will also influence which strategies you select. Some strategies (e.g., public outreach) will be very effective at increasing awareness but may not result in short term, measurable reductions in influent. If the goal of your program is to educate residents regarding a particular issue, then public outreach would be considered an effective strategy. Setting goals for your program are discussed further in the next section.

The following headings in the P2 menu in Appendix A can be used to identify and assess pollution prevention strategies.

Pollution Prevention Strategies

For copper, mercury, FOG, and pesticides, the menu list some strategies that can be used for pollution prevention. For each source or group of sources listed in the Potential Sources column of the menu there will be at least one corresponding strategy listed in the Pollution Prevention Strategies column. These strategies are primarily the specific action or practice that you would like

the target audience to use to reduce pollutant discharges. Many of these strategies will be applicable to other pollutants. For instance, many metals have sources similar to copper, so the copper menu can be used as a starting point for a P2 program for other metals of concern.

Implementation Options

For each P2 strategy there are approaches to implementing the strategy listed in the column called Implementation Options. How you choose to motivate your target audience to adopt the P2 strategy will impact the success of your program. Implementation options for strategies for businesses include inspections, working with trade groups, recognition or incentive programs, workshops, or permitting. Some commercial and industrial controls are very similar to the business controls. Residential implementation options include some different strategies from the businesses, such as public outreach and education, public service announcements, movie theater advertisements, school programs, newspaper articles, and highway billboards (to name a few). Many environmental and stormwater implementation options are similar to residential implementation options.

Cost and Resources Needed

This column is intended to provide information on how resource intensive a strategy is, and strategies are rated on a scale of 1 to 5. If a strategy is considered inexpensive to implement and/or requires minimal additional time of staff, the strategy is rated as a 1. If it is considered to be very expensive or require a large amount of staff time, the strategy is rated as a 5. The rankings for this column and the Wastewater P2 Benefit and Environmental P2 Benefit were based on input from several wastewater agencies who have used or evaluated the strategies.

Wastewater P2 Benefit

This column is intended to provide information on how effective the strategy is in addressing wastewater issues. A strategy with a high wastewater P2 benefit targets a discharge that goes directly to the sanitary sewer and is effective in either directly reducing the quantity of that discharge or in increasing awareness or motivating the behavior change that will ultimately result in the reduction of the discharge. For example, a strategy encouraging vehicle service facilities to seal their floor drains targets wastewater discharges and is potentially effective in reducing wastewater metals discharges. This strategy would be considered to have a high wastewater P2 benefit. An outreach strategy that increases plumbers understanding of the connection between copper pipe corrosion and water pollution would also be considered to have a high wastewater P2 benefit even though it may not result in immediate copper discharge reductions. A fluorescent tube collection program does not target a source associated with a wastewater discharge and would therefore be considered to have a low wastewater P2 benefit. The strategies are rated on a scale of 1 to 5. If the strategy targets wastewater discharges and is considered highly effective in

reducing discharges or in increasing awareness of the issues with the discharge or in changing behavior, the strategy is rated as a 5. If the strategy is not very effective or does not address a wastewater discharge, the strategy is rated as a 1.

Other Environmental Benefit

This column is intended to provide information on how effective the strategy is in providing benefit to other environmental media. For example, the fluorescent tube collection program from the previous example would have the benefit of removing mercury from the environment. Outreach programs targeting brake pad wear are effective in creating awareness of a stormwater discharge. This would have a high environmental benefit even though the benefit to wastewater is low. The strategies are rated on a scale of 1 to 5. If the strategy is considered to be highly effective in providing a non-wastewater environmental benefit, it was rated as a 5. If it was determined to have little benefit outside of wastewater reductions, it was rated as a 1.

Cost effectiveness, potential for influent reductions, and availability of information on strategies are good ways to evaluate P2 strategies. In looking at the P2 menus, it may be clear that certain strategies seem feasible for your particular service area. Additionally, for pollutants not found in the menus, but with the same source (e.g. hospitals), the same strategies and implementation options identified in the menus can often be used.

For constituents that are not in the influent or that have limited information, the first step may be further research and source monitoring to gather more information before assessing P2 strategies.

Establish a Goal for Specific Strategies or Actions

Identifying significant sources and selecting approaches to reducing discharges from these sources are the key steps to designing a P2 program. The other essential step that will help to make your program successful is to establish a goal for your program. This will help to focus your P2 efforts. In establishing a goal it is helpful to have a baseline or starting point. Depending on what are you hoping to achieve, a baseline may be the percent of your service area that is aware of an issue or the number of businesses that are employing a certain practice. Baselines may also be starting influent pollutant concentrations or discharge concentrations from the source.

Setting short-term and long-term goals for pollutant reduction will help to estimate how much pollution prevention is necessary. Whether the goal is to meet a permit limit, to achieve an overall percent reduction in the influent or effluent or to simply achieve some rate of compliance or residential behavioral change, it is important to define a target for the program. Once a goal is established, it will be useful in identifying the applicable effectiveness measurement tool.

The goals set should be realistic. Information on what you can hope to achieve by implementing a P2 option can be based on results of previous actions in your community. Awareness increase after a public education campaign, change in sales patterns or increases in compliance rates for businesses may have been measured in the past in your community. If not, what you can expect to achieve may be based on the experiences of other communities. Some resources on measurement are listed in Section 8 of this Report, Available Resources.

Reviewing the Cost & Resources Needed, Wastewater P2 Benefit and Other Environmental Benefit columns in the menus in Appendix A will give you a sense of how effective your selected strategies and implementation options may be. This may be helpful in setting a realistic goal. However, in general, goal setting will be very community specific and, therefore, is best tailored to an individual service area's needs rather than relying too heavily on outside sources (or pressures) to determine what your program can realistically achieve.

Establish Effectiveness Measures

Once strategies have been selected and goals set, effectiveness measurement must be determined. It is essential that effectiveness measurement is considered during the planning phases not after the program is underway or has been completed. It allows the agency to incorporate measurement tools into the planned activities and make a small addition that will yield valuable information. For example, while planning a program the agency staff may add in some simple record keeping or include one or two extra questions during inspections that will facilitate program evaluation.

Effectiveness measurement may be carried out before, during and after program implementation. Selecting the best measurement tool will depend on whether you are evaluating options during the planning stages of a program or if you are tracking progress during program implementation or if you are evaluating the changes resulting from a completed program. The goals you set will also help to identify the right evaluation tool.

Effectiveness measurement tools are provided in the menus for copper, mercury, FOG, and pesticides. A separate Effectiveness Determination Menu is found after the main menu for each constituent. The first two columns list source and implementation option. In the "Effectiveness Measurement Options" column, recommendations are provided corresponding to each implementation option selected.

These ideas in the Effectiveness Measurement Options column can be used to evaluate how well a strategy is working, and to receive feedback to fine-tune efforts for further pollution prevention. To select a particular measure will depend on the specific goal of your program and your agency's resources. If your goal is to reduce influent levels of the pollutant, then monitoring would be the effectiveness measure. If the goal is an intermediate step like increasing the rate of BMP implementation, then the effectiveness measure would be to evaluate compliance rates through site visits.

A few examples of effectiveness tools may be counting the number of thermometers turned in, the number of coupons used for car washes, or by surveying consumers to see if they recall seeing outreach materials. These examples are related to evaluating outreach programs for residential sources. For commercial and industrial sources, evaluation may be better measured by compliance rates or increase in properly implemented practices at a facility or discharge reductions at the facility.

Implement The Program

At this point in the process, you should have identified the most significant sources and the P2 strategies and implementation options that work best for your program and service area. These elements along with the goals you hope to achieve will describe your program. The next step is to begin implementing the program and determining which strategies to focus on first.

Strategies that are determined to be the most effective with respect to potential for discharge reductions are a good starting point, unless they are cost prohibitive. Also, strategies that are easy and inexpensive to implement are good to consider even if they are only expected to be moderately effective. Deciding how many controls to implement at one time may include a look at how much money and time is available in the short and long-term. If limited funds are available, you may want to implement the most cost-effective strategies first. Future planning could then include setting aside resources for further reduction efforts. Using the P2 menus to develop an implementation plan is described below.

Implementation Options

Implementation options are intended to describe how pollution prevention strategies will be communicated to the target audience. For example, a strategy to reduce amalgam discharges from dentists may be to dispose of traps and filters properly. The implementation options are the approaches to disseminating this information and motivating dentist to adopt this practice. Specific implementation options may be to mail brochures, conduct site visits or conduct workshops. Implementation options for the identified pollution prevention strategies are listed in the P2 menus to correspond to P2 strategies.

Regional or Local Implementation

In the Regional/Local column, options for implementation are categorized as being regional, local or either. Certain options lend themselves to being implemented by several agencies simultaneously especially when a unified message will increase the probability of it being effective. In this case, regional implement may provide opportunities to reach a larger audience with minimal additional effort. Other options may only apply to your service area so local implementation is warranted. Local implementation is most effective when there is a localized problem that can be addressed by catering to a smaller audience. When “either” local or regional pollution prevention can be effective, it is up to each agency to decide whether they can address the problem in their immediate vicinity, or if they would be better suited to team up with other agencies.

Partnering Opportunities

Opportunities for partnering with stormwater and cross-media efforts are also indicated in the P2 menus. Partnering with groups can help to share costs and ideas. Cross-media efforts could include working with other public agencies as indicated in the menus such as air pollution groups, or soil remediation groups. Other partnering opportunities may exist with trade or professional organizations associated with the targeted source.

Evaluate Program Effectiveness

As noted above, effectiveness measurement is carried out before, during, and after a program is conducted. Evaluation tools are important for measuring aspects of the program that are of most interest to the agency.

The effectiveness measurement options listed in the Effectiveness Determination pages of the menus are related to evaluating specific program elements. Selecting these measures was discussed above.

Looking at the overall effectiveness of a program may require combining information obtained from a variety of measurement tools (e.g., survey results in combination with number of items turned in or phone calls received or in combination with changes in sales of certain products, environmental measures). When possible, it is useful to measure overall program effectiveness through changes in influent or effluent levels of pollutants. Another approach, when possible, is to demonstrate the success of a P2 program by estimating the amount of pollutants successfully collected- and not discharged- to the waterworks, storm drains, or environment. Additional resources for ideas on measurement are found in Section 8 of this report.

Modify the Program

Based on the effectiveness evaluation, pollution prevention programs can be modified to improve upon areas that did not accomplish goals, by ramping up efforts that proved to be very effective, discontinuing efforts that may no longer be productive, or shifting priorities to make more effective use of resources. Certain P2 strategies are one-time actions and once they are completed, no future action may be warranted. Once certain strategies are fully implemented, less resources may be needed to maintain them allowing resources to be shifted to address new issues. Other promising strategies may be worth expanding upon. In addition, new pollutant issues arise that require attention and shifting priorities may result in a need to shift resources. Possible results of effectiveness measurement include:

Strategy Not Effective, Goal Not Achieved

If this is the result of your evaluation then the questions to ask are:

Could this strategy be implemented better?

Is there another strategy that may work better?

When sources have been identified, but control measures are not achieving desired results, it is important to reassess your strategies perhaps selecting other strategies or modifying the selected strategy. It may also be that a strategy was effective initially and achieved significant increases in awareness or discharge reductions but that the response may have leveled off. This may not mean the strategy is no longer effective but that it has accomplished as much as can reasonably be expected. You may choose to continue implementing the strategy but at a lower level of effort that allows the effort to be maintained or to discontinue the strategy in favor of a new approach. If it is determined additional results are unlikely from actions targeting a particular source, it may be worthwhile to determine if there is another source to investigate.

Strategy Effective, Goal Not Achieved

If this is the result of your evaluation then the questions to ask are:

Is there another source to work with that may achieve more reductions?

Is there a limit as to how much reduction is possible (and has already been achieved)?

When have we done a reasonable and rational amount of P2?

At some point, it may be necessary to assess the effectiveness of continuing a particular pollution prevention strategy. If the goal of the strategy was discharge reductions, an analysis of influent and effluent data can be a useful tool for assessing whether a reduction in the influent (due to P2) will result in a reduction in the effluent. Influent versus effluent data plots can be a useful tool for this evaluation. However, changes in attitude and behavior of people in the service area are successful results even if there is no reduction in the influent or effluent. Evaluation of the goal may also be in order if a strategy achieved significant results. It may be worthwhile to compare your results with those of other effective P2 programs to determine if your goal was realistic. For example, if your goal is a 75% reduction in influent levels of a pollutant, it would be impossible to achieve that goal by targeting a source that only accounts for 60% of the influent loading. Raising awareness of 50% of the residential audience in your service area may be a difficult goal to achieve through public outreach. If that were your goal, it would be worthwhile to investigate approaches that would enhance a general awareness campaign. Examples include offering financial incentives, partnering with other agencies to expand your program and increase the impact of your message or increasing the time frame over which the change is expected.

Goal Achieved

If this is the result of your evaluation then the questions to ask are:

What actions need to be taken to maintain reduction?

What is the next goal (new pollutant)?

In some cases, P2 may achieve the goals that were set. If a goal is achieved then thought should be given to the steps necessary and level of effort required to maintain the accomplishments. Once a goal is accomplished the opportunity presents itself to shift resources to address other issues and/or additional pollutants of concern. It may be that awareness has been raised to a realistic level and it is time to pursue behavior change or discharge reduction if appropriate. In some cases changing awareness may

be all that is available with respect to certain source or that you have achieved the level of change that is possible for this source. At this point, the decision would need to be made as to whether more work on a certain source or pollutant is still warranted. With the continual emergence of new pollutants and new issues it is important to have the flexibility in your program to de-emphasize certain issues in order to allocate resources to more pressing concerns. This is particularly true in the situation where significant results have been achieved through a range of actions conducted over a long time period. Reducing resources to a maintenance level in order to move on to new challenges may be the best approach.

7. NEXT STEPS

It is important to periodically update your records with new information regarding sources of your pollutants of concern. As discussed above, as strategies are implemented you may reach a point where you have achieved all you can from that strategy. It then becomes imperative to adapt strategies, or add new ones, to meet your pollution prevention goals. Periodic re-evaluation of program goals and resources will help to keep your program on-track and effective.

8. AVAILABLE RESOURCES

There are several websites with information that is useful for developing and implementing P2 programs. Some of these sites are listed below.

In addition, at the end of Appendix A, there are lists of reports and other documents that are associated with copper, mercury, FOG, and pesticides pollution prevention and source identification activities.

General P2 Information

City of Palo Alto: <http://www.city.palo-alto.ca.us/cleanbay/> - On the publications page are source identification studies, pollution prevention plans and sample materials for a range of constituents including metals, dioxins, pesticides, and mercury.

Association of Metropolitan Sewerage Agencies: <http://www.amsa-cleanwater.org/pubs/>

EJnet.org: Web Resources for Environmental Justice Activists. <http://www.EJnet.org/>

INFORM <http://www.informinc.org>

Department of Toxics Substances Control Pollution Prevention Page
<http://www.dtsc.ca.gov/PollutionPrevention/index.html>

EPA Region 9 Pollution Prevention
<http://www.epa.gov/region09/p2/>

Pollution Prevention Resource Exchange <http://www.p2rx.org/> - This site and the regional sites that follow all contain information on a variety of sources and pollutants and other P2 topics.

Regional P2 websites reachable from Pollution Prevention Resource Exchange
Great Lakes Regional Pollution Prevention Roundtable Topic Hubs
<http://www.glrppr.org/hubs/>

Peaks to Prairies Pollution Prevention Information Center
<http://peakstoprairies.org/>

Waste Reduction Resource Center P2 Documents
<http://wrrc.p2pays.org/p2documents.asp>

Western Regional Pollution Prevention Network
<http://www.westp2net.org/>

Pacific Northwest Pollution Prevention Resource Center
<http://www.pprc.org/>

Southwest Network for Zero Waste
<http://www.zerowastenetwork.org/>

Pollutant profiles and uses

US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry.
<http://www.atsdr.cdc.gov/toxpro2.html>

Effectiveness Measurement

PPRC topic hub for Environmental Measurement Table of Contents
<http://www.pprc.org/hubs/toc.cfm?hub=1000&subsec=7&nav=7>

Water Environment Research Foundation. Tools to Measure Source Control Program Effectiveness. Project 98-WSM-2. 2000. (available through www.werf.org)

Water Environment Research Foundation. Controlling Pollution at Its Source: Wastewater and Stormwater Demonstration Project. Project 98-WSM-2. 2001. (available through www.werf.org)

Discussion Groups

These groups are good places to post questions or review their archives for previous discussions

Bay Area Pollution Prevention Group
Post message: BAPPG@yahoogroups.com

Subscribe: BAPPG-subscribe@yahoogroups.com

California Water Environment Association Pretreatment, Pollution Prevention & Stormwater Committee

Post message: cweap3s@yahoogroups.com

Subscribe: cweap3s-subscribe@yahoogroups.com

Pretreatment Coordinators

Post message: Pretreatment_Coordinators@yahoogroups.com

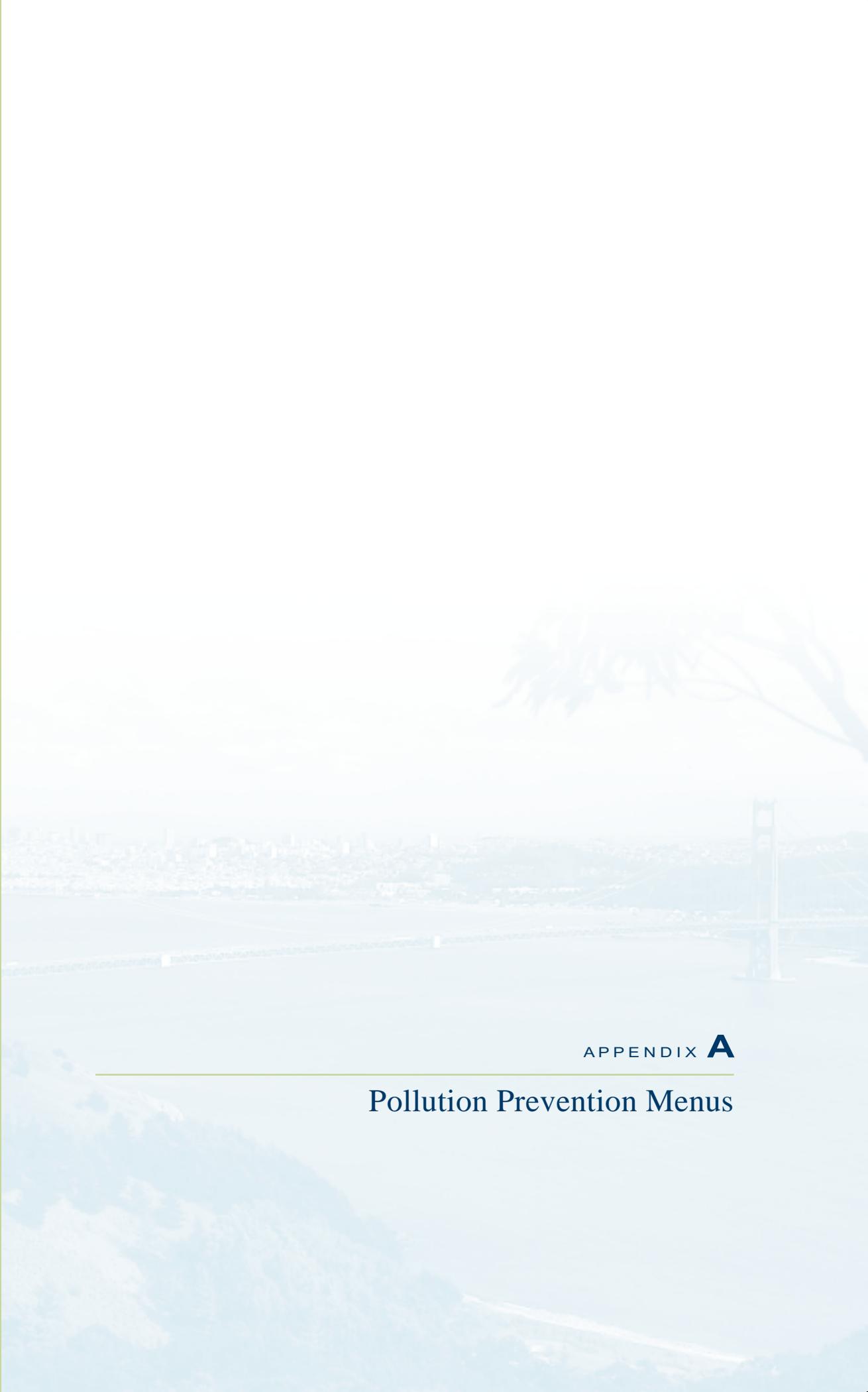
Subscribe: Pretreatment_Coordinators-subscribe@yahoogroups.com

REFERENCES

US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry. Toxicological Profile for Aldrin and Dieldrin. September 2002. <http://www.atsdr.cdc.gov/toxprofiles/tp1.html>

EJnet.org: Web Resources for Environmental Justice Activists. Dioxin Homepage. 2002. <http://www.EJnet.org/dioxin/>

EIP Associates. Organochlorine Pesticides Source Identification. Prepared for Palo Alto Regional Water Quality Control Plant. October 1997. <http://www.city.palo-alto.ca.us/cleanbay/pestpubs.html#Pesticides>



APPENDIX **A**

Pollution Prevention Menus

Copper Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Industrial									
Industries using copper containing chemicals									
Cooling towers*	High		Alternative chemicals	Recognition program	Either	2.4	3.6	2.8	
Boilers	Low			Incentive program	Either	2.8	3.2	2.8	
Boat manufacturers	Low			Merit certificates	Either	2.3	3.0	2.7	
Power generators	Low			Multilingual brochures	Either	3.0	2.5	2.3	
Semiconductors	Low			Workshops	Local	4.0	3.8	2.7	
				Process optimization	Workshops	Local	3.3	3.0	3.0
			Product banning	Legislative	Regional	3.3	4.0	3.0	
Industries with stormwater pollution potential									
Airports	Low	Stormwater	BMPs	Provide handbook	Either	2.0	1.0	3.5	
Waste haulers (brake pads)	Moderate		Reduce vehicle use	Workshops	Either	3.7	1.7	4.0	
				Carpooling	Local	2.0	1.7	3.3	
				Posters	Either	2.3	1.7	3.7	
Industries that may discharge copper									
Industrial laundries	Moderate		Graywater systems	Incentive program	Either	2.8	2.5	2.7	Clothes dryers might benefit too.
Metal finishers	Moderate		Pretreatment	Monitoring	Local	3.0	4.2	3.8	
Food processors	Moderate		BMPs	Provide handbook	Either	2.8	3.0	3.2	
Clothes dyers	Low			Workshops		3.3	3.0	3.3	
Scrap metal recyclers	Low			Recognition program	Either	2.3	3.3	3.3	
Soap manufacturers	Low			Site inspections		2.0	4.0	4.0	
Coil coaters	Low			Merit certificates	Either	2.3	3.3	3.3	
Electroplaters	Moderate			Discharge limits	Permit requirement	Local	1.8	4.3	3.5
Mirror manufacturers	Low		Copper P2	Permit requirement	Either	1.3	4.3	3.7	
Metals manufacturers	Moderate		Zero discharge	Floor drain sealing	Local	1.3	5.0	4.0	
				Site inspections	Local	1.7	4.7	4.0	
				Monitoring	Local	2.3	4.7	4.0	

* Frequently targeted source

(1) 1 = low cost, staff time, 5 = hi cost, staff time

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Copper Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Commercial									
Vehicle service*	High		BMPs	Provide handbook	Either	2.2	2.6	2.3	
				Site inspections	Local	2.2	3.2	3.0	
				Recognition program	Either	2.0	2.2	2.5	
				Voluntary programs	Either	1.8	1.8	2.0	
				Technical workshops	Local	3.0	2.2	2.5	
				Trade Association workshops	Regional	2.8	2.6	2.5	
			Self audits	Provide inspection form	Either	1.6	1.8	1.8	
			Discharge limits	Permit requirement	Local	2.2	3.4	3.3	
			Zero discharge	Floor drain sealing	Local	2.0	4.0	2.8	
				Site inspections	Local	2.0	3.2	2.8	
				Recognition program	Either	2.2	2.6	2.3	
				Monitoring	Local	2.8	2.8	2.0	
				If exceedance, resample at facility's expense	Local	1.8	3.6	2.8	
			Discharge limits	Permit requirement	Local	1.8	3.3	2.8	
			Copper P2	Permit requirement	Either	1.8	3.5	2.5	
Reduce vehicle use	Newspaper articles	Either	2.5	1.5	3.3				
	Multilingual brochures	Either	2.8	1.3	2.5				
	Public event participation	Local	2.5	1.5	2.8				
	School programs/events	Local	2.0	1.3	2.5				
	Newsletters	Either	2.3	1.8	3.0				
Vehicle washing*	High		Interceptor requirements	Permit requirement	Local	2.4	4.0	3.5	
			BMPs	Provide handbook	Either	2.0	2.2	2.6	
Vehicle fleets (brake pads)	Moderate	Brake pad partnership	Reduce vehicle use	Work with fleet managers	Local	2.3	2.5	3.0	
			BMPs	Provide handbook	Either	2.3	1.8	2.8	
Printers*	High		Use alternate inks	Permit requirement	Local	2.5	2.8	3.5	
				Recognition program	Either	2.5	2.0	2.8	
				Incentive program	Either	3.0	2.0	2.8	
				Multilingual brochures	Either	2.5	1.8	2.5	
				Posters in stores	Either	2.5	1.8	2.5	
				Workshops	Local	3.0	2.0	2.8	
			Zero discharge	Permit requirement	Local	2.0	3.0	3.3	
				Floor drain sealing	Local	1.8	3.0	3.3	
				Site inspections	Local	1.5	2.5	2.8	
	Recognition program	Either	2.0	2.0	2.3				
	Monitoring	Local	3.3	1.8	2.0				

* Frequently targeted source

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Copper Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Machine shops	High		Zero discharge	Floor drain sealing Site inspections Recognition program	Local Local Either	1.8 2.2 2.0	3.0 2.7 2.3	2.8 2.6 2.8	
Laundries	High		Pretreatment	Permit requirement Recognition program	Local Either	2.0 2.3	3.4 2.0	3.0 2.3	
			Graywater systems	Incentive program Recognition program	Either Either	2.8 2.8	2.8 2.5	2.8 2.5	
Carpet cleaners	High		BMPs	Provide handbook	Either	2.5	1.8	2.0	
			Clean techniques	Educate customers to request Posters in stores Multilingual brochures	Either	2.0	2.0	2.3	
					Either	2.8	1.8	2.0	
					Either	2.8	1.8	2.0	
Reduce cleaning frequency	Educate homeowners to remove shoes Newspaper notices School programs/events	Either Either Local	2.5 3.0 2.8	1.8 1.0 1.3	2.3 1.8 2.0				
Food service/ Restaurants Medical service Plumbers* Wineries Laboratories	High Low High Moderate Moderate	Local unions	BMPs	Recognition program	Either	2.4	1.8	2.0	
				Provide handbook	Either	2.0	1.8	2.0	
				Green Business Program	Regional	1.8	2.0	2.0	
	Pretreatment		Provide drain filters	Local	2.7	3.0	2.0		
Radiator repair*	Moderate		Zero discharge	Floor drain sealing	Local	1.8	3.5	2.0	Radiator shops should be closed loop with no discharge.
				Recognition program Monitoring	Either Local	2.0 3.0	2.5 3.0	1.7 1.7	
Businesses using copper containing chemicals									
Cooling towers* Swimming pools* Boatyard (marine paint) Ceramic painting Surface cleaners*	High Moderate Low Low Moderate		Alternative chemicals	Merit certificates	Either	2.2	3.0	3.3	
				Recognition program	Either	2.3	2.5	2.7	
				Incentive program	Either	2.3	2.5	2.7	
				Multilingual brochures	Either	2.8	2.3	2.7	
				Posters in stores	Either	2.3	2.3	2.7	
			BMPs	Workshops Provide handbook	Local Either	3.0 2.5	2.3 2.0	2.3 2.3	
Businesses with stormwater pollution potential									
Bus yards Corporation yards Schools	Low Low Low	Stormwater Stormwater	BMPs	Provide handbook	Either	2.4	1.0	1.8	
				Treatment Plant tours	Local	2.2	1.2	2.0	
		Source identification	Site inspections Monitoring	Local Local	2.8 3.3	1.0 1.0	2.0 2.0		

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Residential										
Vehicle washing*	Moderate	Local Car Washes	Wash on lawn	Newspaper articles	Either	2.2	1.4	2.3		
				Multilingual brochures	Either	3.0	1.5	2.3		
				Public event participation	Local	2.5	1.5	2.3		
				School programs/events	Local	2.3	1.5	2.3		
				Newsletters	Either	2.0	1.5	2.3		
			Driveway replacement porous	Workshops Incentive program	Local Either	3.5 3.0	1.5 1.5	2.7 2.7		
Use commercial wash	Bill inserts	Either	1.2	1.2	2.5					
	Coupons for car washes	Local	2.8	1.0	2.7					
Vehicle home repair	Low		BMPs	Workshops	Local	3.0	1.3	2.0	Workshop attendance is usually low.	
				Free bus service to workshops	Local	3.0	1.3	2.0		
				Point of sale work with stores	Local	3.0	1.5	2.0		
				Posters in auto parts stores	Either	2.8	1.0	2.0		
Products containing copper										
For pools/spas	Moderate		Alternative chemicals	Multilingual brochures	Either	2.8	1.8	2.3		
				Posters in stores	Either	2.3	1.8	2.3		
				Work with stores	Either	2.5	2.3	2.3		
Root control CuSO4*	Moderate		Product banned	Legislative	Regional	3.0	3.0	3.0		
				Remind plumbers & hardware stores of ban	Multilingual brochures	Either	2.8	2.3		3.0
				Root control product collection	Posters in stores	Either	3.3	2.0		2.0
Fungicide CuSO4 Pesticides CuSO4 Nonpesticide CuSO4	Low Low Low		Alternative chemicals	Work with stores	Either	2.6	1.4	2.5		
				School programs/events	Local	2.8	1.0	2.5		
				Telephone, mail	Local	3.2	1.4	2.5		
				Collect at local facility	Local	4.0	1.8	2.7		
				Free bus service to dropoff	Local	3.5	1.3	2.7		
Other household products	Low		HHW collection	Collect at local facility	Local	2.4	2.2	3.3		
				Newspaper notices	Local	2.0	1.4	3.3		
			Recycling programs	School programs/events	Local	3.0	1.3	3.0		
				Public event participation	Local	2.3	1.5	3.0		
				Multilingual brochures	Either	2.8	1.3	3.0		
				Treatment Plant tours	Local	2.8	1.5	3.0		

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Illegal dumping	Moderate	Stormwater	Alternate disposal	Bill inserts	Either	2.0	1.2	2.8	
				Newspaper notices	Either	2.5	1.0	2.0	
			Neighborhood watch program	Public meetings	Local	2.8	1.0	2.3	
Hobbyists	Low		Alternative chemicals	Availability of alternative	Either	2.5	2.0	1.7	
Electronic etching Ceramic painting Jewelry making	Low Low Low		Proper waste management	School programs/events	Local	2.8	1.3	1.7	
				Job fair participation	Local	2.8	1.5	1.7	
				Workshops	Local	3.0	1.5	1.7	
				Public event participation	Local	3.0	1.5	1.7	
				Free bus service to events	Local	3.5	1.3	1.7	
				Multilingual brochures	Either	3.3	1.3	1.7	
				Posters in stores	Either	3.3	1.3	1.7	
				Work with stores	Local	3.3	1.8	1.7	
			Web page	Either	3.0	1.3	1.7		
Human waste	Low		Uncontrollable			1.0	1.0	1.0	
Laundry graywater*	Moderate		Graywater systems	Incentive program	Local	3.3	2.0	2.0	
Food waste	Low		Compost instead of garbage disposal	Web page	Either	2.0	1.8	1.0	
				Workshops	Local	2.8	2.2	1.5	
				Posters in stores	Either	2.6	1.6	1.0	
				Free composting bins	Local	3.6	2.2	1.3	

* Frequently targeted source

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Copper Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Environmental Corrosion*									
	High	Water purveyor	Copper rule changes	Legislative	Regional	3.6	3.8	1.7	
			Assess pH	Monitoring	Local	2.0	3.2	1.5	
			Source identification	Monitoring	Local	3.3	3.5	1.7	
			Adjust pH	Chemical or physical adjustment	Regional	2.5	3.8	2.3	
			Plumbing BMPs	Install BMPs	Either	2.5	3.3	1.7	
			Modify lead and copper rule	Legislative	Regional	3.8	3.5	1.7	
			Champion Regional Approach			3.3	3.0	1.7	
			Product substitution (nonCu pipe) BMPs	Educate plumbers Workshops	Either Local	3.0 3.5	3.3 3.0	1.3 1.3	
Water supply									
Algaecide CuSO4*	Moderate	Local	Alternative chemicals	Availability of alternative	Local	1.8	3.8	3.0	
				Work with water purveyors	Local	1.8	3.5	3.0	
Atmospheric deposition									
Tailpipe emissions	Moderate	Air Quality Management District	Reduce vehicle use	Multilingual brochures	Either	2.3	1.3	3.3	
				Posters in stores	Either	2.5	1.3	3.3	
				Carpooling	Local	2.0	1.3	3.3	
				Newspaper articles	Either	2.5	1.3	3.3	
				School programs/events	Local	2.5	1.3	3.3	
			Refine emissions requirements	Permit requirement	Regional	3.8	1.3	3.3	
Stormwater									
Brake pad wear Construction site runoff	High Moderate	Brake pad partnership	Source identification	Monitoring	Either	3.5	1.0	2.0	
			Discharge limits	Permit requirement	Local	1.8	1.0	3.3	
Infiltration/Inflow* Parking lot runoff	Low Moderate	Stormwater	Alternative brake pad material	Work with fleet managers	Local	2.4	1.2	3.5	
			Reduce vehicle use	Work with fleet managers	Local	2.0	1.3	3.3	
Architectural Cu ornaments	Low		BMPs	Install BMPs	Local	2.0	1.0	3.3	
Roof runoff: residential Roof runoff: commercial	Moderate Moderate		Building requirements for Cu	Legislative	Regional	3.3	1.0	3.3	
				Provide handbook	Either	2.8	1.0	3.3	
				Multilingual brochures	Either	2.8	1.0	3.3	
				Posters in stores	Either	2.8	1.0	3.3	
			Newspaper articles	Either	2.5	1.0	3.3		

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Copper Pollution Prevention Effectiveness Determination Menu

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Hobbyists	Availability of alternative materials	Number of locations where alternatives are available Survey regarding use of alternatives
Algaecide CuSO ₄	Availability of alternative chemicals	Survey to determine the extent of alternative chemical use
Residential	Bill inserts	Recognition survey of bill inserts
Brake pad wear	Carpooling	Survey to determine the extent of carpool use
Corrosion	Chemical or physical adjustment	Influent load change or reduction after adjustment
Household hazardous waste	Collect at local facility	Quantity of chemical collected and survey intentions of future alternative use
Vehicle washing	Coupons for car washes	Number of coupons turned in
Carpet cleaning	Educate customers to request clean techniques	Number of requests for clean techniques
Carpet cleaning	Educate homeowners to remove shoes	Survey to determine shoe-removal practice changes due to education
Corrosion	Educate plumbers	Percent Cu pipe removed from plumbing system
Commercial	Floor drain sealing	Number of businesses that switch to zero discharge
Household hazardous waste	Free bus service to dropoff	Number using the bus service
Residential	Free bus service to workshops	Number using the bus service
Food waste	Free composting bins	Number distributed and survey to determine number in use
Commercial	Green Business Program	Number participating in the program
Commercial	If exceedance, resample at facility's expense	Number of exceedances
Commercial and residential	Incentive program	Number participating in the program
Stormwater	Install BMPs	Number of best management practices (BMP) installed
Corrosion	Install BMPs	Number of BMPs installed, measure influent load change or reduction after installation
Residential	Education at job fairs	Survey of educational impact on job fair participants
Commercial, corrosion, stormwater	Legislative	Has legislature passed? Measure change or reduction of influent load
Commercial	Merit certificates	Number of certificates issued
Commercial & stormwater	Monitoring	Measure influent load change or reduction Measure the pH level

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
		Number of sources identified through monitoring program
Commercial & residential	Multilingual brochures	Survey to determine the impact of the brochures

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Commercial & residential	Newsletters	Monitor the response or feedback to the newsletters
Commercial & residential	Newspaper articles	Monitor the response or feedback to the newsletters
Commercial & residential	Newspaper notices	Survey to determine the impact of the notices
Industrial & commercial	Permit requirement	Number of industries and commercial businesses in compliance with their permits
Residential	Point of sale work with stores	Number of stores participating, survey to determine the number of clients affected
Industrial	Posters	Survey to determine the impact of the posters
Residential	Posters in auto parts stores	Survey to determine the impact of the posters
Commercial & residential	Posters in stores	Survey to determine the impact of the posters
Wineries	Provide drain filters	Number of filters installed
Industrial, commercial, stormwater	Provide handbook	Number of BMPs in use
Vehicle service	Provide inspection form	Observe trends in completed inspection forms
Residential	Public event participation	Number participating in the event
Residential	Public meetings	Number participating in the meeting
Industrial & commercial	Recognition program	Number participating in the program Survey the reduction in chemical use due to the program
Residential	School programs/events	Quiz scores indicate new knowledge acquired Teacher evaluations of the program
Industrial & commercial	Site inspections	Number requiring follow-up inspections or other work Number of sources identified and controlled
Vehicle service	Technical workshops	Quiz scores indicate new knowledge acquired
Cu chemicals	Telephone, mail	Survey to determine the impact of the phone calls and mailings
Vehicle service	Trade Association workshops	Number participating in the workshops
Residential	Treatment Plant tours	Quiz scores indicate new knowledge acquired
Vehicle service	Voluntary programs	Number participating in voluntary programs
Residential	Web page	Survey to determine the impact of the web page
Brake pad wear	Work with fleet managers	Measure the percent reduction in vehicle hours Measure the reduction in vehicle mileage
Cu chemicals	Work with stores to reduce chemical use and sale	Number of stores and store employees participating

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Corrosion	Work with water purveyors	Track changes or reductions in water corrosivity
Industrial, commercial, residential, corrosion	Workshops	Number participating in the workshops Survey to determine behavioral changes due to workshops Measure the percent reduction in vehicle hours Measure influent load changes or reduction Quiz scores indicate new knowledge acquired

Mercury Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Industrial									
Manufacturing									
Caustic soda: mercury cell*	Low		BMPs	Include requirements in permits	Local	2.5	3.0	4.5	
Electronics industries	Low		Cease production of product			3.0	1.0	2.5	
Electroplaters	Moderate		Phase out use			3.0	1.3	2.5	
Adhesives / sealants	Low		Pretreatment						
Cement manufacturing	Low		National mercury labeling requirement	Legislative	Regional	3.5	3.0	4.5	
Glass products	Low		Recycling	Recognition program	Either	1.7	1.7	3.0	
Lime manufacturing	Low		Alternative production methods	Incentive programs for industries	Either	3.5	3.0	4.5	
Mercury compounds production	Low		Use alternative materials	Industry outreach / education	Either	2.0	2.5	4.5	
Iron & steel manufacturing	Moderate		Establish a spill response plan	Workshops	Local	2.5	2.0	4.0	
Paper manufacturing	Moderate		Proper disposal			2.3	1.7	3.0	
Secondary mercury production	Low		Inventory					4.0	
Bookbinding	Low								
Plating and polishing	Low					2.0	1.0	2.5	
Pulp mills	Moderate					2.0	1.0	2.5	
Thermal power generation	Low								

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Chemicals									
Alkalies and chlorine*	Moderate		Alternative production methods	Include requirements in permits	Local	1.5	3.0	4.5	
Laboratories	Moderate		Improve operation efficiency			1.7	1.0	2.0	
Industrial laundries	High		Modify processes			1.7	1.0	2.0	
Acid mine drainage	Moderate		Alternative feedstock chemicals						
Boiler chemicals	Moderate		Pretreatment						
Chemical manufacturing	Low		BMPs			1.5	1.0	2.5	
Copper ores	Low		Safe recycling or disposal						
Ferric chloride	Low		Alternative materials	Incentive programs for industries	Either	3.5	3.0	4.5	
Fungicides for seeds and turf	Moderate		Cease production of product	Recognition program	Either	2.0	2.0	4.0	
Industrial chemicals	Low		Clean wastewater system, remove Hg	Industry outreach / education	Either	2.0	2.5	4.0	
Pesticides	High		Establish a spill response plan	Workshops	Local	2.0	1.7	3.0	
Polymers	Low		National mercury labeling requirement			2.0	1.7	3.0	
Potassium hydroxide	Low		Practice sound management			2.0	1.7	3.0	
Preservatives	Moderate					1.5	1.0	2.5	
Sodium bisulfate	Low					1.5	1.0	2.5	
Sodium hydroxide	Low					1.5	1.0	2.5	
Sodium hypochlorite	Low					1.5	1.0	2.5	
Sulfuric acid	Low					1.5	1.0	2.5	
Wastewater treatment defoamants	Moderate					1.7	1.7	2.5	
Wastewater treatment polymers	Moderate					1.7	1.7	2.5	
Boilers (electric utility)	Moderate								
Boilers (non-utility)	Moderate								
Cooling towers	High					2.5	1.0	2.5	
Photofinishing labs	High					2.0	1.0	2.0	

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Mercury Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Combustion									
Fuel / gasoline burning	Moderate	Air pollution	Pretreatment	Include requirements in permits	Local	2.0	1.0	3.7	
Coal combustion	Moderate	Air pollution	Reduce levels of Hg in products incinerated			2.3	1.0	3.3	
Crematories	Low		BMPs	Industry outreach / education	Either	2.0	1.0	4.7	Not a wastewater source.
Incinerators (hazardous waste, medical waste, municipal waste)	High	Air pollution	Discourage burning of treated wood			2.5	1.0	5.0	
Production									
Semiconductors	High		Alternative materials	Product bans	Regional	3.3	2.3	2.7	
Fireworks	Low		Conventional controls to lower Hg emissions	Work with manufacturers	Regional	3.0		3.5	
Metal finishing	Moderate		Alternative production methods			2.7	1.0	2.7	
			Proper equipment disposal	Industry outreach / education	Either	2.0	1.0	3.0	

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Mercury Pollution Prevention Menu

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Commercial									
Dentists*	High	CDA Local Dental Societies	Amalgam management	Business outreach	Either	2.1	2.8	2.2	
			Amalgam separators	Workshops	Either	2.3	3.0	2.2	
			Clean wastewater system, remove Hg	Certifications	Local	2.2	3.5	2.3	
				Permit requirement	Local	2.2	2.8	2.0	
				Recognition program	Either	2.4	2.3	1.5	
Laboratories	Moderate	DTSC HELP program	Ban hazardous items	Legislative	Regional	2.3	2.3	2.2	
Educational facility	Moderate		Install and maintain drain traps	Business outreach	Either	2.3	2.3	2.0	
Medical/hospital*	High		Remove mercury containing items	Workshops	Either	2.6	2.6	2.0	
				Certifications	Local	2.7	3.0	3.0	
Laundries	Moderate		Install graywater system	Incentive program	Either	2.3	2.0	1.7	
Switches	High		Proper equipment disposal	Workshops	Local	1.6	2.0	2.8	
Veterinary clinics	Moderate		Remove mercury containing items	Recognition program	Local	2.0	2.3	2.0	
			Clean wastewater system, remove Hg			1.5	1.5	2.0	
			Alternative materials			1.5	1.5	2.0	
			Recycle bulk mercury			1.3	2.0	2.3	
			Proper equipment disposal			2.0	2.5	2.3	
Vehicle service facilities	High		Clean wastewater system, remove Hg	Business outreach	Either	2.6	2.0	2.3	
			Alternative materials	Workshops	Either	2.2	1.4	1.8	
			Proper equipment disposal	Certifications	Local	2.0	1.4	1.8	
			Sweep floors before washing	Permit requirement	Local	1.6	2.0	2.5	
				Recognition program	Either	1.8	1.7	2.3	
Sidewalk / street power washing	High	Stormwater	Sweep streets/sidewalks before washing BMPs	Educate City employees	Local	1.6	1.2	2.2	

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POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Portable toilets	Low		Alternative chemicals	Business outreach	Either	1.5	2.5	3.0	
Septage haulers	Low		Clean wastewater system, remove Hg	Recognition program	Either	1.8	1.5	2.0	
Sewer flushing	Low		Long-term source control to lower concentrations in the environment	Incentive program	Either	2.5	2.0	2.3	
Sewerage systems	Low		Alternative materials	Workshops	Local	2.0	1.7	2.3	
Automobiles (switches, lamps, batteries)	Low		Proper equipment disposal			1.7	1.7	2.3	
Batteries	Moderate		Alternative production methods	Certifications	Local	1.8	2.6	3.3	
Electricity measurement instruments	Low			Permit requirement	Local	1.3	2.3	3.3	
Gauges	Low		Ban hazardous items	Legislative	Regional	2.0	2.6	3.0	
Pottery glaze	Moderate					1.5	1.0	2.0	
Kaolin & ball clay	Moderate					1.5	1.0	2.0	
Latex paint	Moderate					1.5	1.5	2.5	
Office machines	Low					1.5	1.5	2.5	
Pharmaceutical products	Low					1.5	1.5	2.5	
Plastics products	Low					1.5	1.5	2.5	
Printing ink	Moderate					1.7	1.3	2.0	
Rubber products	Moderate					1.7	1.3	2.0	
Small arms ammunition	Low					1.3	1.3	2.0	
Sphygiometers	Low					1.5	1.5	2.5	
Thermostats	Moderate					1.3	2.0	2.7	
Wood products	Low					1.5	1.5	2.5	
Scrap dealers	Low					1.5	1.5	2.5	

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Mercury Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Residential									
Household Products									
Fluorescent light tubes	High	Local HHW Programs	Ban Hg thermometers	Legislative	Regional	3.2	2.2	2.8	An airborne source, but not a significant source to POTWs. An opportunity to address a somewhat significant controllable source and a good opportunity from a collaborative viewpoint. 2006 disposal ban.
Thermometers*	High	Other Local agencies	Alternative materials	Public outreach / education	Either	2.4	2.1	2.5	
Contact lens solutions	High		Promote non-Hg thermometers	Coupons	Local	2.3	2.3	3.3	
Deodorant	Low		Practice energy efficiency	Implement thermometer exchange program	Local	2.0	2.7	3.7	
Food coloring	Low		Point-of-sale brochures	Local	2.3	2.3	3.3		
Carburetor tuning kit	Low		Proper disposal of old/broken items	Household hazardous waste program	Either	2.3	2.7	3.7	
Mouthwash	Low					1.0	1.5	3.0	
Perfumes, cosmetics	Low					1.0	1.5	3.0	
Toilet paper	Low					1.0	1.5	3.0	
Toothpaste	Low					1.0	1.5	3.0	
Paint	Low					1.0	1.5	3.0	
Dental									
Dental fillings	High		Uncontrollable			1.3	1.3	1.0	
Human wastes (amalgam)*	Low					1.0	1.0	1.0	
Cleaning Products									
Cleaners	Low		Alternative materials	Public outreach / education	Either	1.8	2.2	2.5	
Dish detergent	Low		Product removal	Outreach to stores	Either	2.0	2.0	2.3	
Dishwater detergent	Low		Cease production of product	Outreach to manufacturers	Regional	2.0	2.3	2.7	
Drain cleaners	Low					1.7	1.3	1.5	
Laundry detergent	Low					1.7	1.3	1.5	
Shampoo	Low					1.7	1.3	1.0	
Shaving cream	Low					1.7	1.3	1.0	
Soaps	Low					1.7	1.3	1.0	
Bleach	Low					1.7	1.3	1.0	

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Mercury Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Food Products									
Canned tuna/meat	Moderate		Long-term source control to lower concentrations in the environment	Public outreach / education	Either	2.7	1.3	2.7	
Eggs	Low					2.0	1.5	3.0	
Condiments	Low					2.0	1.5	3.0	
Foodwaste	Low					2.0	1.5	3.0	
Fresh fruit & vegetables	Low					2.0	1.5	3.0	
Fresh seafood & meats	Moderate					2.0	1.5	3.0	
Frozen & canned vegetables	Low					2.0	1.5	3.0	
Fruit juice	Low					2.0	1.5	3.0	
Rice	Low					2.0	1.5	3.0	
Salt	Low					2.0	1.5	3.0	
Soft drinks and mixes	Low					2.0	1.5	3.0	
Sugar	Low					2.0	1.5	3.0	
Non-dairy creamer	Low					2.0	1.5	3.0	
Other									
Electric lamp breakage	Moderate		Proper disposal of old/broken items	Public outreach / education	Either	2.0	1.3	2.7	
Laundry graywater	Moderate		Long-term source control to lower concentrations in the environment	Incentive program	Either	2.3	2.0	2.0	
			Graywater system			2.0	2.0	2.0	
Electricity consumption	Low	PG&E, local utilities	Practice energy efficiency			1.7	1.3	2.7	
Human wastes (dietary intake)	Low		Uncontrollable			1.7	1.3	1.3	
Motor oil leakage	Low		Minimize and/or contain leaks	Public outreach / education	Either	2.8	1.8	1.8	
Athletic shoes, lighted	Moderate			Household hazardous waste program		2.5	1.0	1.0	
Novelty items	Low			2.5		1.0	1.0		
Used motor oil	Moderate			2.0		1.0	1.0		
Chemistry sets, older toys and games	Low			2.0		1.0	1.0		

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Mercury Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Environmental									
Atmospheric deposition	Moderate	Air pollution	Long-term source control to lower concentrations in the environment	Public outreach / education	Regional	2.7	1.0	3.7	DTSC estimates 40% from volcanism.
Natural erosion and reservoir spills	Low					1.0	1.0	1.0	
Volcanoes	Low		Uncontrollable			1.0	1.0	1.0	
Water supply	Low	Water purveyers				1.0	1.0	1.0	
Forest fires	Low					1.0	1.0	1.0	
Stormwater									
Construction erosion	Moderate	Stormwater	BMPs	Permit requirement	Local	1.7	1.3	2.7	
Sediment erosion	Moderate		Long-term source control to lower concentrations in the environment	Public outreach / education	Either	2.7	1.7	3.0	
Stormwater runoff	High	Stormwater				3.3	1.0	2.7	

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Mercury Pollution Prevention Effectiveness Evaluation Menu

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Commercial	Business outreach	Compile inventory of products on shelves
	Outreach to stores	Reduction in sales
Dentists	Dentist education	Measure quantity of amalgam recycled
		Measure quantity of amalgam used
		Survey dentists on practices used
		Number of amalgam separators installed
	Permit dentists	Permit compliance Measure dental waste
Industrial	Incentive programs for industries	Measure concentrations in products
	Industry outreach / education	Measure concentrations in collection systems
		Measure concentrations in drainage
		Measure concentrations in products Measure concentrations in emissions
	Work with manufacturers	Measure concentrations in products
Industrial & commercial	Certifications	Best management practice implementation rates
	Include requirements in permits	Compile inventory of products on shelves
		Measure concentrations in facility discharges
		Measure concentrations in products
		Measure smokestack emissions
	Recognition programs	Number participating
	Other exchange programs	Measure concentrations in collection systems
	Permits	Measure concentrations in collection systems
		Permit compliance
Product bans	Product removal from inventory	
Workshops	Measure concentrations in collection systems	
Laundries	Outreach to laundries	Measure concentrations in laundry graywater
Manufacturers	Outreach to manufacturers	Measure concentrations in residential wastewater
Residential	Food advisories	Track reported sales
	Household hazardous waste program	Quantity turned in
	Outreach to public	Measure concentrations in products
	Point-of-sale brochures	Number distributed
		Track reported sales
	Public outreach / education	Survey change in product use Track reduction in sales
Residential & commercial	Coupons	Number used

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
	Implement thermometer exchange program	Number of thermometers exchanged
Stormwater	Stormwater best management practices	Measure concentrations in runoff

Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Residential									
Active Pesticides									
Food waste	Low		Alternative products	Public outreach / education	Either	2.3	1.5	2.7	
Household pesticides: mothproofing, termites *	High		Integrated Pest Management	Highway billboards	Either	2.7	2.3	3.7	
Stored pesticides	Low		Proper use education	Public service announcements	Regional	2.3	2.4	3.3	
			Phase out use	Newspaper articles	Either	2.0	2.4	3.3	
			Use flea / tick comb	Speakers for community groups	Either	2.0	2.4	3.3	
				Movie theater slides	Local	2.0	2.2	3.0	
				School programs	Either	2.0	2.2	3.0	
			Master Gardener workshops	Regional	2.0	2.6	3.5		
			Public event displays	Local	2.0	2.4	3.3		
			Regional recognition program	Regional	2.0	2.4	3.3		
Cancel registration of chemical		Legislative	Regional	3.0	2.3	3.0			
Banned Pesticides									
Ant / flea / grub control (diazinon)	High	Stormwater	Public education regarding alternative	Regional recognition program	Regional	1.7	1.8	2.7	
Flea and tick treatment (lindane)	High	Local agencies	Alternative products	Conduct training for City staff	Local	1.7	1.5	2.3	
Head lice / scabies control (lindane)	High	Department of	Provide disposal options	Household hazardous waste collection	Local	2.7	2.3	3.3	
Moth control (lindane)	High	Pesticide	Proper disposal education	Public event displays	Local	1.7	1.8	3.0	
Older wool clothing (dieldrin)	Low	Regulation	Use flea / tick comb	Education	Either	2.3	1.5	2.3	
Residential use (diazinon)	Moderate			Point-of-sale brochures	Local	1.7	2.0	3.0	
Water supply (dieldrin)	Low			Training programs	Local	2.3	2.3	3.3	
Food waste	Low					1.5	1.3	2.5	
Household pesticide: mothproofing, termites (dieldrin)	High					1.5	1.3	2.5	
Human waste	Low					1.5	1.3	2.5	
Stored pesticides	Low					1.5	1.3	2.5	

* Frequently targeted source

(1)1=low cost, staff time, 5=high cost,staff time

(2)1=low ww benefit, 5=hi ww benefit

(3) 1=low non-ww environmental benefit, 5=hi non-ww environmental benefit

Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Environmental									
Banned Pesticides									
Air disposition of pesticides	Low	Air pollution	Soil remediation	Permitting for remediation efforts	Local	3.7	2.3	3.3	Not well studied. Applies to subsistence/sport fishing only in South Bay, as there are no South Bay fisheries.
Air transport / evaporation (dieldrin)	Moderate		Uncontrollable			2.3	1.5	2.0	
Pesticide residues in soil (DDT)	Low					3.0	1.3	2.5	
Pesticides in food web	Low					3.0	1.3	2.5	
Pesticide residues in soils treated for termites (chlordane)	Moderate					3.0	1.3	2.5	
Residual levels (dieldrin)	Moderate					3.0	1.3	2.5	
Sediment	Low					2.3	1.3	2.5	
Tissue: fish and clams	Moderate					3.0	1.3	2.5	

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Pesticide P2 Menu

April 1, 2004

Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Commercial									
Active Pesticides									
Algicides (tributyltin oxide)	High		Alternative products	Public outreach / education	Either	3.3	1.8	2.0	TBT is a de-minimus source banned in the 9 county Bay area for several years.
Apartment buildings (tributyltin)	Low		Integrated Pest Management	Newsletters		2.7	2.3	3.0	
Carpet cleaners (tributyltin oxide)	Moderate		Proper use education	Highway billboards	Either	3.3	2.3	3.0	
Commercial facilities / pest control (tributyltin oxide)*	Moderate			Public service announcements	Regional	2.7	2.0	2.7	
Cooling towers + cooling water additive (tributyltin)*	High			Newspaper articles	Either	2.7	2.0	2.7	
Boatyards (tributyltin)	Moderate			School programs	Either	2.7	1.8	2.3	
Janitorial services (tributyltin)	High			Speakers for community groups	Either	2.7	2.0	2.7	
Kennels (diazinon)	Moderate			Training programs	Local	3.3	2.5	3.3	
Medical facilities (tributyltin)	Low			Movie theater slides	Local	2.7	1.8	2.3	
Office buildings (tributyltin)				Public event displays	Local	2.7	2.0	2.7	
Pest control operators (diazinon)*	High			Regional recognition program	Regional	2.7	2.0	2.7	
Pet care / groomers (lindane)*	High		Phase out use	Create annual report of pesticide use	Local	2.5	2.3	3.0	
Pet wash center (self-service, diazinon)	Moderate		Cancel registration of chemical	Legislative	Regional	3.0	2.3	3.7	
Pharmacies (lindane)	Low					2.0	1.3	3.0	
Schools (tributyltin)	Low					2.0	1.3	3.0	
Shopping centers (tributyltin)	Low					2.0	1.3	3.0	
Structural pest control (diazinon)*	High					2.0	1.3	3.0	
Supermarkets (tributyltin)	Low					2.0	1.3	3.0	

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Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Banned Pesticides									
Airports and landing fields (diazinon)	Low		Public education regarding alternatives	Regional recognition program	Regional	1.7	1.8	3.0	
Golf courses (diazinon)	Moderate	Stormwater	Alternative products	Conduct training for City staff	Local	1.7	1.5	2.7	
Greenhouses (diazinon)	Moderate		Provide disposal options	Collection program	Local	2.7	1.5	3.7	
Landscapers (diazinon)	High	Partner cities, school districts	Proper disposal education	Public event displays	Local	1.7	1.5	3.0	
Nurseries (diazinon)	Moderate	Stormwater	Use flea / tick comb	Education	Either	2.3	1.5	2.7	
Pesticides in imported materials and foods	Low			Point-of-sale brochures	Local	2.0	1.5	3.3	
				Training programs	Local	2.3	1.5	3.7	

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Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Industrial									
Active Pesticides									
Cleaning water	Low	Stormwater	Alternative products	Workshops	Local	2.0	2.8	3.3	
Cooling towers (tributyltin)*	High		Phase out use	Permit requirement	Local	1.3	2.8	3.3	
Dairy farm milk handling facility (diazinon)	Low		Proper use education	Public outreach / education	Either	2.3	2.0	2.3	
Food processing / handling (diazinon)	Low		Cancel registration of chemical	Legislative	Regional	2.7	2.3	3.3	
Hazardous waste management	High					1.5	1.3	2.5	
Landfills	High					1.5	1.3	2.5	
Water treatment plant effluent	High					1.5	1.3	2.5	
Banned Pesticides									
Cleaning water	Low	Stormwater	Public education regarding alternatives	Regional recognition program	Regional	1.7	1.8	2.0	
Hazardous waste management	High		Alternative products	Conduct training for City staff	Local	1.7	1.5	1.7	
Landfills	High		Proper disposal education	Training programs	Local	2.7	2.3	2.7	
Water treatment plant effluent	High		Provide disposal options	Collection program	Local	2.7	2.3	2.7	

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Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Products									
Active Pesticides									
126 active pesticides / herbicides	High		Alternative products	Workshops	Local	2.3	2.3	3.3	
Anti-fouling paints (tributyltin)	Moderate		Phase out use	Permit requirement	Local	1.7	2.3	3.3	
Fungicide (Tributyltin Benzoate)	Low		Proper use education	Public outreach / education	Either	2.7	1.5	2.3	
Marine paint (Tributyltin Methacrylate)	Moderate		Cancel registration of chemical	Legislative	Regional	2.7	2.3	3.3	
Material preservative (Tri-n-butyltin maleate)	Low					1.5	1.3	2.5	
Paint additive (tributyltin oxide)	Low					1.5	1.3	2.5	
Toilet bowl cleaner (tributyltin oxide)	Low					1.5	1.3	2.5	
Wood preservative (tributyltin oxide)	Low					1.5	1.3	2.5	
Wood protective treatment (diazinon)	Low					1.5	1.3	2.5	
Banned Pesticides									
Soil & turf insect control (diazinon)	Moderate		Alternative products	Education	Either	2.3	1.5	2.3	
				Regional recognition program	Regional	1.7	1.5	2.7	
				Provide disposal options	Collection program	Local	2.7	1.5	3.3

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Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Stormwater									
Banned Pesticides									
Storm water inflow (dieldrin)*	Moderate	Stormwater	BMPs	Permit stormwater discharges	Local	1.7	1.5	3.0	

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Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Agricultural									
Active Pesticides									
Agricultural pesticides*	High	Stormwater	Permit discharge	Fines for non-compliance	Local	2.0	1.5	2.0	
Livestock spray (lindane)	Moderate	Stormwater	Phase out use	Workshops	Local	2.7	1.5	3.0	
Screwworm & ear tick killer (lindane)	Moderate	Stormwater	Alternative products	Public outreach / education	Either	3.0	1.5	2.7	
Bee farming (diazinon)	Moderate	Stormwater	Proper use education	Training programs	Local	3.0	1.5	3.7	
Root and top dip for non-food plants	Moderate	Stormwater		Public service announcements	Regional	2.3	1.5	3.0	
				Newspaper articles	Either	2.3	1.5	3.0	
				Public event displays	Local	2.3	1.5	3.0	
			Cancel registration of chemical	Legislative	Regional	3.3	2.3	3.7	
Banned Pesticides									
Agriculture pesticides (dieldrin)	High	Stormwater	Alternative products	Education	Either	3.0	1.5	2.7	
Corn + citrus pesticide (dieldrin)	Moderate	Stormwater		Regional recognition program	Regional	2.3	1.5	3.0	
Seed coat (dieldrin)	Moderate	Stormwater	Provide disposal options	Collection program	Local	3.3	1.5	3.7	
Tse tse fly & termite spray (dieldrin)	Moderate	Stormwater				2.5	1.3	3.0	
Root and top dip for non-food plants (dieldrin)	Moderate	Stormwater				2.5	1.3	3.0	

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Pesticide Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
All									
Active Pesticides									
Human waste (dieldrin)	Low	Regional	Alternative products Integrated Pest Management	Public outreach / education	Either	1.0	1.0	1.0	
Public buildings (diazinon)	Low			Highway billboards	Either	3.0	2.0	3.3	
Structural (diazinon)	Low		Proper use education	Public service announcements	Regional	2.3	1.8	3.0	
Water supply	Low		Phase out use	Newspaper articles	Either	2.3	1.8	3.0	
				School programs	Either	2.3	1.5	2.7	
				Movie theater slides	Local	2.3	1.5	2.7	
		Speakers for community groups		Either	2.3	1.8	3.0		
		Cancel registration of chemical	Legislative	Regional	4.5	2.3	5.0		
Banned Pesticides									
Human waste (dieldrin)	Low	Stormwater	Alternative products	Movie theater slides	Local	2.3	1.5	2.7	
Parks, recreation areas (diazinon)	Moderate			Master Gardener workshops	Regional	2.3	2.0	3.3	
Water supply	Low	Regional	Provide disposal options	Point-of-sale brochures	Either	2.7	2.0	3.3	
				Collection program	Local	3.3	2.3	3.7	

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Pesticide Pollution Prevention Effectiveness Evaluation Menu

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Industrial & commercial	Conduct training for City staff, partner cities, school district staff regarding pest control issues	Quiz scores indicate new knowledge acquired
		Survey to determine changes in pesticide use
Commercial	Create annual report of City pesticide use	Track trends of pesticide use
Residential, commercial, agricultural	Displays at farmer's markets, community events, and corporate fairs	Survey for recognition and changes in pesticide use
Residential, commercial, all	Highway billboards with education about Integrated Pest Management (IPM) plans	Number of new IPM plans generated
Residential & commercial	Implement regional recognition program	Number participating in recognition program
Residential, all	Master Gardener workshops	Number of people attending the workshops
Residential, commercial, all	Movie theater slides	Survey for recognition and changes in pesticide use
Residential, commercial, all	Newspaper articles	Survey for recognition and changes in pesticide use
Commercial	Newsletters	Number of people reached via newsletters
		Survey for changes in pesticide use
Industrial	Permit pesticides in industrial waste	Permit compliance rates
Stormwater	Permit stormwater discharges	Monitor stormwater, track changes
Environmental	Permitting for remediation efforts	Monitor runoff, track changes
Residential, commercial, agricultural, all	Phase out use	Measure concentration changes in soil, food web, and atmospheric deposition
		Monitor influent and effluent concentration changes
Industrial	Phase out use in industry	Monitor collection system concentration changes
Residential, commercial, all	Point-of-sale brochures	Survey for recognition and changes in pesticide use
		Request sales data from hardware stores, track changes in pesticide sales
Every source	Public outreach / education	Survey for recognition and changes in pesticide use
Residential, commercial, agricultural, all	Public service announcements	Survey to determine the effect of the announcements
Agriculture	Require phase-out of certain agricultural pesticides, with fines for non-compliance	Inventory the pesticides stored on farms, track changes
Residential, commercial, all	School programs	Request teacher evaluations of the program
		Track changes or reduction in pesticide sales
Residential, commercial, all	Speakers for community groups	Track trends in pesticide use

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Commercial & agricultural	Training programs	Number of people trained per event Quiz scores indicate new knowledge acquired
Agriculture	Workshops for farmers	Survey for changes in pesticide use Inventory the pesticides stored on farms, track changes
Industrial	Workshops for industries	Track changes in industrial wastewater concentrations Number of people participating in the workshops

Fats, Oils, and Grease Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Industrial									
Food processors Food production	High		Interceptors/Traps	Installation	Local	2.7	4.4	3.0	
				Site inspections	Local	3.2	4.0	2.8	
				Maintenance schedule	Local	2.3	4.4	3.0	
			Interceptor/Trap maintenance	Posters	Either	2.3	3.0	1.7	
				Workshops	Local	2.0	2.7	1.7	
				Site inspections	Local	2.8	3.4	2.3	
			Discharge limits	Permit requirement	Local	2.2	3.4	2.3	
				Permit records	Either	2.2	3.4	2.3	
			FOG BMPs	Provide handbook	Either	2.5	2.5	1.3	
				Posters/Outreach	Either	2.5	2.5	1.3	
				Newsletters	Either	2.5	2.5	2.0	
				Site inspections	Local	2.7	3.5	2.3	
				Incentive program	Either	2.7	2.7	1.7	
Recognition program	Either	2.0		2.7	1.7				
Industrial machinery	Low		BMPs	Provide handbook	Either	2.3	2.0	2.0	
				Workshops	Local	2.3	2.3	2.3	
			Zero discharge	Floor drain sealing	Local	2.3	3.8	4.0	
				Site inspections	Local	2.3	3.3	3.0	
				Recognition program	Either	2.0	2.3	2.3	
				Monitoring	Local	3.0	3.0	3.0	
				Distribute hydrophobic mops	Local	3.7	3.0	3.0	

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Fats, Oils, and Grease Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes				
Commercial													
Restaurants*	High	Tri-TAC CALFog Workgroup California Restaurant Association	Interceptors/Traps	Installation	Local	2.7	3.4	2.5					
				BMP based permits	Local	2.8	3.0	3.0					
				Site inspections	Local	3.3	3.5	2.6					
				Interceptor/Trap maintenance	Posters	Either	2.5	2.5	2.0				
				Workshops	Local	3.0	3.0	2.3					
		Site inspections	Local	3.1	3.6	2.6							
		Local collection system staff	Discharge limits	Permit requirement	Local	2.5	3.3	2.8					
				Permit records	Local	2.6	3.6	2.8					
		FOG BMPs				Provide handbook	Either	2.4	2.8	2.0			
						Posters	Either	2.0	2.5	2.0			
Multi-lingual brochures	Either					2.5	2.7	2.0					
Newsletters	Either					3.0	3.0	2.7					
Site inspections	Local					2.9	3.4	2.8					
Incentive program	Either					2.3	2.8	2.3					
Recognition program	Either					2.0	2.8	2.3					
Grocery stores	Low			Interceptors/Traps	Installation	Local	2.4	3.0	2.3				
					Incentive program	Either	2.0	1.8	1.7				
					Maintenance schedule	Local	2.7	3.3	2.3				
				FOG BMPs				Posters	Either	2.3	1.8	1.3	
								Workshops	Local	2.8	2.0	1.7	
								Multi-lingual brochures	Either	3.0	2.3	1.3	
								Site inspections	Local	3.0	3.2	2.3	
Recognition program	Either	1.7	2.0	1.7									
Hospitals	Moderate			FOG BMPs	Posters	Either	2.0	2.0	1.5				
					Workshops	Local	2.5	2.0	2.0				
					Multi-lingual brochures	Either	2.0	2.0	1.5				
					Site inspections	Local	3.2	3.4	3.0				
				Interceptors/Traps				Installation	Local	2.7	3.3	2.3	
								BMP based permits	Local	2.3	2.7	3.0	
								Incentive program	Either	2.5	2.0	2.0	
								Interceptor maintenance	Posters	Either	2.0	1.7	1.5
Workshops	Local	3.3	2.0	2.0									
Site inspections	Local	3.2	4.0	3.0									

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Fats, Oils, and Grease Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Schools	Moderate		FOG BMPs	Posters	Either	2.3	1.8	1.3	
				School programs/events	Local	2.3	1.3	1.3	
				Multi-lingual brochures	Either	2.8	1.8	1.3	
			Interceptors/Traps	Installation	Local	2.0	2.8	2.3	
				Cleaning	Local	1.6	2.4	2.3	
			Grease bin	Installation	Local	1.3	2.3	2.3	
				Posters	Either	2.3	1.3	1.3	
				School programs/events	Local	1.7	1.3	1.3	
				Multi-lingual brochures	Either	2.7	1.3	1.3	
Vehicle and truck service	Moderate		Motor oil BMPs	Provide handbook	Either	2.1	1.3	2.0	
				Site inspections	Local	2.0	2.3	2.8	
				Recognition program	Either	1.9	2.3	2.3	
				Voluntary programs	Either	1.5	1.3	1.7	
				Permit requirement	Local	2.4	3.1	3.0	
			Motor oil recycling	Incentive program	Either	2.5	2.0	2.3	
				Recognition program	Either	1.9	2.0	2.3	
				Posters	Either	2.5	1.7	2.0	
				Workshops	Local	2.8	1.8	2.2	
			Zero discharge	Multi-lingual brochures	Either	2.8	2.4	2.2	
				Floor drain sealing	Local	2.3	2.8	3.0	
				Distribute hydrophobic mops	Local	3.0	2.3	3.1	
Vehicle and truck fleets	Moderate	Stormwater	Motor oil BMPs	Provide handbook	Either	2.3	1.7	1.8	
				Permit requirement	Local	2.3	3.1	2.8	
				Recognition program	Either	2.2	2.0	2.2	
				Incentive program	Either	2.3	2.0	2.2	
				Distribute hydrophobic mops	Local	3.0	2.7	2.8	
			Vehicle maintenance	Posters	Either	2.5	1.7	1.8	
				Workshops	Local	2.8	2.8	2.5	
				Multi-lingual brochures	Either	2.7	1.8	2.0	
Gas stations	High		Motor oil BMPs	Provide handbook	Either	2.7	1.3	1.7	
				Permit requirement	Local	1.7	2.3	2.7	
				Distribute hydrophobic mops	Local	3.3	2.3	2.7	
			Oil & Grease separator	Incentive program	Either	2.7	1.7	2.0	
				Regular servicing	Local	2.5	3.0	2.7	

* Frequently targeted source

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(2) 1 = low ww benefit, 5=hi ww benefit

(3) 1=low non-ww environmental benefit, 5=hi non-ww environmental benefit

Fats, Oils, and Grease Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes	
Residential										
			Sewer line cleaning	Sewer line cleaning	Local	4.3	3.7	2.3	Assumes agency does it.	
Apartments* High Density Housing	Moderate	Apartment & Building Managers	Education	Multi-lingual brochures	Either	2.8	2.5	1.3		
				Newsletters	Local	1.8	2.8	2.0		
				Work with managers	Local	2.5	2.8	1.7		
			Grease bin/Residential collection cans	Installation	Local	1.8	3.3	2.3		
				Incentive program	Either	2.3	2.3	1.7		
			Grease interceptor	Installation	Local	2.8	3.0	2.3		
			Incentive program	Either	3.0	1.7	1.7			
			Maintenance	Local	2.8	3.0	2.3			
Cooking waste*	High		FOG BMPs	Posters/Outreach	Either	2.8	2.8	1.3		
				Booths at grocery stores	Local	2.5	2.5	1.3		
				Multi-lingual brochures	Either	3.0	3.0	1.3		
				Posters at grocery stores	Either	3.3	2.5	1.3		
				Educational give-aways	Local	3.5	2.5	1.7		
				School programs/events	Local	3.0	2.6	1.3		
				Household FOG collection	Local collection facility	Local	3.7	2.7	2.3	
Vehicle oil change	Moderate		Used oil collection	Local collection facility	Local	2.8	1.8	3.0		
				Curbside collection	Local	2.3	1.8	3.0		
				Motor oil BMPs	Newspaper articles	Either	2.3	1.3	2.7	
					Multi-lingual brochures	Either	2.3	1.0	2.3	
					Posters at stores	Either	2.3	1.0	2.3	
Illegal dumping	Moderate	Local collection system staff	Disincentive program	Workshops	Local	2.0	1.7	2.7		
				Fines	Regional	2.8	2.0	2.7		
				Newspaper notices	Either	2.0	1.0	2.0		
Vehicle leaks	Moderate	Stormwater	Motor oil BMPs	Multi-lingual brochures	Either	3.0	1.0	2.0		
				Posters at stores	Either	2.7	1.0	2.0		
				Newspaper articles	Either	2.3	1.3	2.3		
				Provide driveway catch traps	Local	3.0	1.8	2.0		
Hobbyists	Low		Oil BMPs	Multi-lingual brochures	Either	2.7	1.3	1.3		
				Posters at stores	Either	2.3	1.3	1.3		
				Newspaper articles	Either	2.0	1.7	1.7		

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Fats, Oils, and Grease Pollution Prevention Effectiveness Determination Menu

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Residential	Best management practice (BMP) installation	Track FOG changes or reduction in sewer line Number of BMPs installed
Residential	Booths at grocery stores	Survey to determine the impact of booths
Industrial & commercial	Cleaning interceptors/traps	Monitor frequency of cleaning
Vehicle oil	Curbside collection	Quantity of FOG collected
Industrial & commercial	Distribute hydrophobic mops	Number of mops distributed Survey to determine the number of mops used
Residential	Educational give-aways	Survey to determine effectiveness of give-aways
Industrial, vehicle service	Floor drain sealing	Number of businesses that convert to zero discharge
Industrial & commercial	Incentive program	Number of interceptors installed Number participating in the program
Industrial, commercial, residential,	Installation of interceptors or BMPs	Number of interceptors or BMPs installed Monitor sewers for load changes or reductions
Residential	Local collection facility	Quantity of FOG collected
Commercial	Maintenance records	Observe trends in the number of plumber call-outs
Industrial & commercial	Monitoring	Number of sources identified through monitoring Track changes or reductions in the influent load
Industrial, commercial, residential	Multi-lingual brochures	Survey to determine the impact of the brochures
Industrial, commercial, residential	Newsletters	Survey to determine the impact of the newsletters
Residential & environmental	Newspaper articles	Survey to determine the impact of the articles Track feedback from articles
Illegal dumping	Newspaper notices	Survey to determine the impact of notices
Industrial & commercial	Permit records	Observe historic trends in compliance rate
Industrial & commercial	Permitting	Number of industries and commercial businesses in compliance with their permits
Industrial, commercial, residential	Posters	Survey to determine number of posters in use Track changes or reduction in discharges Survey to determine the impact of the posters
Residential food FOG	Posters at grocery stores	Survey to determine the impact of the posters

SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Residential vehicle oil	Posters at stores	Survey to determine the impact of the posters
Residential vehicle oil	Provide driveway catch traps	Number of traps distributed Survey to determine number of traps in use
Industrial & commercial	Provide BMP handbook	Survey to determine number of BMPs in use Track changes or reduction in discharges
Industrial & commercial	Recognition program	Number participating in the program

Fats, Oils, and Grease Pollution Prevention Menu

POTENTIAL SOURCE	EXISTING RESOURCES	PARTNERING OPPORTUNITIES	POLLUTION PREVENTION STRATEGIES	IMPLEMENTATION OPTIONS	REGIONAL/ LOCAL	Cost & Resources Needed (1)	Wastewater P2 Benefit (2)	Other Environmental Benefit (3)	Notes
Environmental									
Highway runoff	High	Stormwater	Motor oil BMPs	Installation	Local	1.0	1.0	1.5	
			Vehicle maintenance	Posters at stores	Regional	2.3	1.0	2.0	
				Newspaper articles	Regional	2.0	1.3	2.3	
				Workshops	Local	2.3	1.3	2.3	
Parking lot runoff	Moderate	Stormwater	Motor oil BMPs	Installation	Local	1.0	1.0	2.0	
			Vehicle maintenance	Posters at stores	Either	2.3	1.0	2.0	
				Newspaper articles	Either	1.7	1.3	2.3	
				Workshops	Local	2.3	1.3	2.3	

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SOURCE EXAMPLES	IMPLEMENTATION OPTION EXAMPLES	SOME EFFECTIVENESS MEASUREMENT OPTIONS
Commercial & residential	Regular servicing of oil & grease separator	Use service records to determine frequency of service
Residential	School programs/events	Request teacher evaluations of the program
Industrial, commercial, residential	Sewer line cleaning	Observe trends in the number of plumber call-outs
Industrial & commercial	Site inspections	Number of BMPs in use
		Track changes in the number of illicit discharges
		Number of sites requiring follow-up inspections or other work
		Track changes or reductions in the influent load
Industrial & commercial	Voluntary programs	Number participating in the programs
Residential	Work with apartment managers	Survey to determine behavioral changes in apartment residents
Industrial, commercial, residential	Workshops	Quiz scores indicate new knowledge acquired

Copper Pollution Prevention Menu References

Feasibility Studies:
West County Wastewater District
Union Sanitary District
Las Gallinas Valley Sanitary District
Sewerage Agency of South Marin
San Mateo
Novato Sanitary District
Benicia
Fairfield-Suisun Sewer District
East Bay Municipal Utility District
Delta Diablo Sanitary District
Central Marin Sanitary Agency
Central Contra Costa Sanitary District
Burlingame
Sonoma Literature Review
Novato Literature Review
Sonoma Source Identification
Novato Source Identification
Pollution Prevention Reports:
Union Sanitary District
Sonoma County Water Agency
Delta Diablo Sanitary District
Fairfield-Suisun Sewer District
Novato Sanitary District
Dublin San Ramon Services District
Clean Bay Plan 2002 - PPP for the Regional WQCP and City of Palo Alto
Action Plan: Copper and Nickel Pollution Prevention Activity Investigation at POTWs
Copper Step 1 - General Program Design

Fats, Oils, and Grease Pollution Prevention Menu References

WERF Woodland Oil and Grease Assessment
Burlingame Feasibility Analysis
Union Sanitary District Pollution Prevention Report
City of San Leandro Pollution Prevention/Waste Minimization Program
EBMUD 2002 Pretreatment and Pollution Prevention Report
Burlingame 2000 Pollution Prevention Report

Mercury Pollution Prevention Menu References

Ref	Title	Author	Agency/Organization	Date
1	Problem Constituents Discharged from Dental Businesses in the City and County of San Francisco	Barrucci, Dana, Moeller, in cooperation with the San Francisco Dept. Pubic Works, BERM		6-May-88
2	Clean Bay Plan 1998	City of Palo Alto RWQCP	For the East Palo Alto Sanitary District, Los Altos, Los Altos Hills, Mountain View, Palo Alto, and Stanford	1998
3	Memo: 1998 Copper and Mercury Load Calculations	Larry Walker Associates: Cooper, A.	To Kelly Moran, Palo Alto RWQCP	2-May-95
4	Note To: Daniel Standfree, about the Great Lakes "virtual elimination" program for mercury	EPA Office of Prevention, Pesticides and Toxic Substances: Darr, J.	Prepared for Daniel Standfree, packet of mercury information developed by EPA's Great Lakes National Program Office for their "Virtual Elimination" program.	7-Feb-91
5	Mercury Source Identification	EIP Associates	Prepared for Palo Alto Regional Water Quality Control Plant	12-Aug-93
6	Blueprint for Mercury Elimination: Mercury Reduction Project Guidance for Wastewater Treatment Plants	Funded by the Great Lakes Protection Fund, Great Lakes Pollution Prevention Centre, and Western Lake Superior Sanitary District.	Prepared for the Western Lake Superior Sanitary District	Feb-93
7	Strategy to Reduce Diazinon Levels in Creeks in the San Francisco Bay Area	Gosselin, S. and Scanlin, J.	Prepared for: The Alameda County Flood Control and Water Conservation District	Jul-93
8	A Toxics Reduction Strategy for the Greater Milwaukee Area	Greater Milwaukee Toxics Minimization Task Force (TMTF)		Apr-87
9	1998 Mercury Sources	EIP Associates: Johnson, B.	Technical Memorandum to Kelly Moran, Palo Alto RWQCP	22-Apr-95
10	City of Palo Alto Mercury Use	EIP Associates: Johnson, B.	Memorandum to Kelly Moran, Palo Alto RWQCP	22-Apr-95
11	Mercury Pollution Prevention Plan	Larry Walker Associates	Prepared for Palo Alto Regional Water Quality Control Plant	Sep-93

Mercury Pollution Prevention Menu References

Ref	Title	Author	Agency/Organization	Date
12	Power Washing Runoff Quality and Parking lot runoff: data referenced in Surface Cleaner Control Guideline Development for Bay Area POTWs	Larry Walker Associates	Prepared for: The San Francisco Bay Area Pollution Prevention Group	18-Jan-95
13	City and County of San Francisco Cooling Tower Study	Montgomery-Watson	Prepared for the City and County of San Francisco	Aug-91
14	Northeast States/Eastern Canadian Provinces Mercury Study: A Framework for Action	Northeast States for Coordinated Air Use Management		Jan-94
15	Investigation of Mercury Discharges in the Service Area of 23rd and 91st Ave Wastewater Treatment Plants	NPDES Permits	Prepared for the cities of Glendale, Mesa, Peoria, Phoenix, Scottsdale, Tempe, and Gilbert, Arizona	5-Apr-91
16	Mass Loadings of Used Motor Oil + Latex Paints to the Sewerage System	San Francisco Water Pollution Prevention Program		Oct-89
17	Metals Control Measures Plan (Volume 1) and Evaluation of Nine Metals of Concern (Volume 2)	Woodward-Clyde	Prepared for the Santa Clara Valley Runoff Pollution Prevention Program	11-Feb-93
18	memo: Initial Work for the Mercury P2 Plan	Larry Walker Associates	To Paula Kehoe, SF Public Utilities Commission; Daniel Rourke, SF Water P2 Program	17-Nov-95
19	Evaluation of Domestic Sources of Mercury	AMSA	AMSA	Jun-96
20	Mercury in Dental Facilities	MWRA	MWRA	Aug-93
21	Mercury Reduction through Mercury-Free Posterior Restorations (dental cavity fillings): Background information and options	Met Council Sustainability Team	MCES	4-Jun-96
22	SVCS D Mercury Study Interim Report		SVCS D	31-Mar-96
23	Draft Wisconsin Mercury Sourcebook	USEPA	Wisconsin DNR	Apr-93
24	AMSA Mercury Source Control Workgroup Program Characterization Questionnaire	AMSA	AMSA	Jun-95
25	Mercury, Get Mad Now, Not Later!	WLSSD	public	
26	Mercury Effects, Sources and Control Measures	Brooks Rand, UCD	SFEI	Aug-92
27	Mercury: In Your Community and the Environment	P2 Partnership, Wisconsin DNR	public	
28	Background Information on Hg Sources and Regulations	Ross & Associates	EPA	1994
29	Hospital Mercury Workgroup Steering Committee Executive Summary Report	MWRA/MASCO	MWRA/MASCO	22-Jun-91

Mercury Pollution Prevention Menu References

Ref	Title	Author	Agency/Organization	Date
30	Milwaukee Mercury Source Sector Assessment	P2 Partnership, Wisconsin DNR, MMSD	EPA	Sep-95
31	Elimination of Mercury Switches in Underhood and Trunk Lamps	Michigan DEQ	GM	1996
32	Evaluation of Domestic Sources of Mercury	AMSA	AMSA	Jun-96
33	MEMO: Mercury Amalgam Treatment Technologies for Dental Offices	EIP	Palo Alto WQCP	7/9/1996
34	Mercury Thermometer Source Control Program		Palo Alto WQCP	Mar-96
35	Don't Flush Mercury Down the Drain!	Palo Alto	Palo Alto WQCP	Aug-96
36	Report on the management of mercury-bearing dental wastes in King County, 1991-2000	King County	King County	May-96
37	Used Fluorescent Tubes Fact Sheet	King County	King County	
38	Mercury Effects, Sources and Control Measures	Brooks Rand, UCD	SFEI	Aug-92
39	MWRA/MASCO Mercury Work Group (www.masco.org/mercury/)	MASCO		2000
40	Dentistry and the Environment	MWRA	Mass. Dental Soc.	Dec-93
41	Novato Sanitary District Mercury Reduction Study Interim Report	Novato Sanitation District	Novato Sanitation District	6/30/1996
42	MEMO: Mercury Source Identification Update: Dental Offices and Human Waste	EIP	Palo Alto WQCP	3/1/1995
43	Evaluation of the Effectiveness of POTW Mercury Pollution Prevention Programs	LWA	AMSA Proposal	6/28/1996
44	The Oregon Mercury Solution Team	OEC	OEC	
45	Zero Tolerance: Persistent Poisons in Oregon: Sources and Solutions	OEC	OEC	
46	MEMO: Update on Mercury Characterization Project	Vivian Matkivich	AMSA Hg Workgroup	1/4/1996
47	Mercury Sources in the Sacramento River Watershed: Preliminary Report	LWA	SRWP	Dec-95
48	Mercury Pollution Prevention in Healthcare	NWF-Great Lakes Field Office	public	Jun-93
49	Minutes from Mercury Workgroup	Great Lakes Mercury Workgroup	Mercury Workgroup	3/22/1994

Pesticide Pollution Prevention Menu References

Ref	Title	Author	Agency/Organization	Date
1	Diazinon and Chlorpyrifos in Influent from Residential and Commercial Sources: Final Report (Volume 1 of 2 - Summary Report)	Aqua-Science	Submitted to: Central Contra Costa Sanitary District	Sep-91
2	RWQCP: Clean Bay Plan 1996	City of Palo Alto	For the communities of East Palo Alto, Los Altos, Los Altos Hills, Mountain View, Palo Alto, and Stanford	1996
3	RWQCP: Clean Bay Plan 1998	City of Palo Alto	For the East Palo Alto Sanitary District, Los Altos, Los Altos Hills, Mountain View, Palo Alto, and Stanford	1998
4	Outdoor Use of Diazinon and Other Insecticides in Alameda County	Cooper, A. and Scanlin, J.	Prepared for: The Alameda County Flood Control and Water Conservation District	Aug-93
5	Diazinon in Urban Areas	Cooper, A. RWQCP, City of Palo Alto		Jul-92
6	Organochlorine Pesticides Source Identification	EIP Associates	Prepared for Palo Alto Regional Water Quality Control Plant	27-Oct-93
7	Strategy to Reduce Diazinon Levels in Creeks in the San Francisco Bay Area	Gosselin, S. and Scanlin, J.	Prepared for: The Alameda County Flood Control and Water Conservation District	Jul-93
8	Residential and Commercial Source Control to Meet Water Quality Goals	Larry Walker Associates	Water Environment Research Foundation	1998
9	Organochlorine Pesticides Pollution Prevention Plan	Larry Walker Associates	Prepared for Palo Alto Regional Water Quality Control Plant	Sep-93
10	City of Davis Pollution Load Reduction Program, Task 1.1: Background Information for PPP	LWA	Prepared for the city of Davis	11-Jun-91
11	City of Davis PLRP, Pollution Prevention Program Development	LWA		Dec-92

Pesticide Pollution Prevention Menu References

Ref	Title	Author	Agency/Organization	Date
12	City and County of San Francisco Cooling Tower Study	Montgomery-Watson	Prepared for the City and County of San Francisco	Aug-91
13	Department of Pesticide Regulation Chemical Ingredients Database		www.cdpr.ca.gov	1999
14	RWQCP: Clean Bay Plan 2003	City of Palo Alto	For the communities of East Palo Alto, Los Altos, Los Altos Hills, Mountain View, Palo Alto, and Stanford	Jan-99
15	Union Sanitary District Annual Pollution Prevention Report	Union Sanitary District		Aug-99



APPENDIX **B**

Using a Quantitative Approach to Source Identification

Wastewater characteristic data can be used to estimate loadings, where available. It may be useful to perform calculation with available data to help assess where the largest reductions of influent sources may be found. For instance, comparing relative influent loads from different sources of a pollutant may make it clear which source is most controllable or most significant.

The average water use per household is often estimated to be 200 gallons per day (gpd), unless study specific data are available. Where water use data for commercial activities is not available, flows can be estimated from literature values. Using concentrations and wastewater flows, loadings for each source type can be calculated. For example, the copper load from carpet cleaners may be calculated as follows*:

Copper Load from Carpet Cleaners =

$$330 \text{ ug/L/cleaner} \times 100 \text{ gpd/cleaner} \times 6 \text{ carpet cleaners} \times \text{conversions} = 0.749 \text{ grams Cu/day}$$

Some loads could be calculated using number of dentists, number of people, or number of households, such as in the following calculation of mercury in human waste*:

Mercury Load from Human Waste (due to amalgam) =

$$17.2 \text{ ug/person/day} \times 108,000 \text{ people} \times \text{conversions} = 1.207 \text{ grams Hg/day}$$

The overall influent load can be evaluated in 2 ways. The first method sums estimated loads from each individual commercial, industrial, and residential source. The second method uses the average trunkline monitoring results for commercial, industrial, and residential sources as well as flows for these areas to estimate loadings.

One approach to calculating your own load reduction estimations includes filling out plant data spreadsheets. In the first step of source loading estimations, information should be collected including number of households, influent/effluent concentrations, and any previous source investigation information. Since commercial and residential activities are similar from community to community, it may also be worthwhile to contact other agencies to see if they have useful source data. Data entered into the plant data spreadsheet are linked to a second spreadsheet, which uses available plant information and source values from previous studies to calculate loadings for each identified source (similar to the calculations described above).

To develop reasonable load reduction calculations, it is helpful to use data that accurately accounts for a majority of the pollutants moving through each plant. Therefore, the degree of mass balance closure should be determined to assess the quality of available data. Factors used to assess the quality of the source load estimations include:

* note: data is not steadfast and is only used to show a simulated calculation

- Number of influent and effluent samples reported
- Analytical method and detection limits
- Degree of mass balance closure
- Availability of all requested information.

However, even if mass balances are found to be less than accurate, load calculations may still help to distinguish between large and small sources.

Strategies can be prioritized by determining the potential effectiveness of each control strategy, and the cost to implement the strategy. The effectiveness of the pollution prevention strategies can be estimated on the basis of the level of participation anticipated and the maximum load reduction that may be achieved by the strategy. Effectiveness and cost can then be compared to assess the strategy by taking the product of the participation factor (percent who will participate) and the load factor (amount of pollutant load reduction from a source if there was 100% participation).

$$\text{Effectiveness Rating} = \text{Participation Factor} * \text{Loading Factor}$$

For instance, business outreach to dentists may achieve a loading factor of 90%, but if only 50% of dentists can be expected to participate, the effectiveness rating is only 45%. Similarly, if a residential graywater system can produce a loading factor of 100%, but only 2% of households install the systems, the effectiveness rating is only 2%, and very little overall reduction can be expected.

A sensitivity analysis can be conducted to assess the impact of varying pollutant values in the spreadsheets. By varying these values it is possible to get a sense of how influential the numbers used for these sources could be on reduction estimates, pollutant concentrations, compliance, and project costs.